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NEWS IN BRIEF

Over-ordering hits CA

MASSIVE over-ordering of some stocks and shortages of others are the main reasons given by Computer Automation for the loss that the company expects to make in its financial year which ends on July 1. A company spokesman said that significant management changes had been made in the US as a result of these problems. He added that this year had been poor everywhere for CA with turnover in Europe only up by 25% when it should have been 50% higher than the previous year.

TT races score

THE Univac 90/30 which handles all the Isle of Man government's DP requirements was called into service to provide the scoring and lap-marking for the world famous Manx TT motor-cycle races. The software was written by Univac and data was entered and results displayed on Uniscop VDU's around the track.

Profits up 74%

RECORD revenues and profits have been reported by Mohawk Data Sciences, MDS, for the financial year to the end of April. Revenues rose by 17 per cent from \$152.6 million to \$178.2 million. More encouraging still was a rise in profits from \$5.5 million to \$9.6 million, an increase of 74 per cent. Earnings per share rose from 72 cents to \$1.10.

COMPUTER WEEKLY

Surprise marketing move by Apple

IN a sudden change of marketing policy, Apple Computer, through its European marketing arm, Eurapple, has appointed Data Efficiency of Hemel Hempstead, as master distributor for the UK. As from June 20, Data Efficiency is the sole importer of Apple Computer products to Britain.

The move has surprised existing distributors none of whom received any communication from Eurapple about the impending change. The first they heard was when Data Efficiency contacted them last week to offer sub-distributorships.

Negotiations are now going on with the companies concerned, Personal Computers,

Keen Computers and Lynx Computers. They could provide Data Efficiency with healthy business. Personal Computers managing director, Miles Starland, said last week that his June sales were over £150,000, and growing. Keen Computers sales were around £80,000 this month.

Orders already placed by the distributors to meet projected sales are to be honoured by Apple. Keen has six months' worth totalling about £750,000, while Personal Computers has two months to come.

Data Efficiency will be selling the Apple range through its Microsense offshoot. It has

been appointed because it was able to meet criteria for master distributorship. These include, according to an Apple statement, strong financial resources, and the provision of sufficient software and hardware support capabilities.

Mike Brewer, managing director of Data Efficiency, said his company, with an annual turnover of some £2.5 million last year, was investing about £500,000 in stock, and intended to maintain stock levels at that figure in the future.

Personal Computers now has its lawyers considering its position following Apple's move.

\$630m leasing writ for Lloyds

LLOYDS of London and 57-Lloyds underwriters are being sued for a total of \$630 million by Federal Leasing of McLean, Virginia, one of the original third party lessors in the US to use the controversial Lloyds "J" policy for insuring the residual values of IBM mainframes.

A spokesman for Federal Leasing told Computer Weekly that the \$630 million included \$27 million worth of claims under "J" policies that had not been paid, and that the rest was for damages.

Federal is charging the underwriters with allegedly abusing their obligation under the "J" policy and with allegedly jeopardising Federal's reputation in the leasing business.

He explained that Lloyds had paid \$11 million to Federal in claims over a period that started about two years ago, but that nine months ago Lloyds stopped paying any more claims. It had given no explanation.

He said that Federal was now losing money and that the company was "in peril". It had lost a lot of new leasing business.

Federal was one of the earliest users of the "J" policy starting in 1974 and the original value of the machines covered was well over \$100 million.

The original value of all the machines covered by "J" policies has been estimated at considerably more than \$1,000

million, the biggest single user being ITEL.

Loss adjusters have already calculated that it could cost the underwriters well over \$200 million if they have to pay out on all the claims.

They stopped writing new "J" policies on IBM processors late in 1977 (CW, December 8, 1977) after the announcement of the low-cost IBM 303X machines which drastically affected the residual values of leased 370s.

The "J" policy was used overwhelmingly by US-based lessors, and one of the few European users, Promodata, does not envisage having to make any claims because the residual values it assigned to the machines it covered were all low — no more than 10% on any CPU according to the company.

In contrast, some of the US-based leasing firms that used "J" policies assigned residual values as high as 50% to machines that they wrote leases on three or four years ago. The machines are now being returned by their original lessees and are realising as little as 25% when they are remarketed, hence the massive claims on Lloyds.

Funding of Project Gamma

AS a final venture before its role is absorbed by other government schemes, the DoI's Advanced Computer Technology Project is to fund a further phase of Software Science's Project Gamma.

Nexos deal settled in principle

AGREEMENT between Nexos and Muirhead over selling facsimile equipment for office systems is "very close now," according to Nexos managing direc-

tor Muir Moffat. He told Computer Weekly that the deal (CW, May 17) was settled in principle and now just the legal nitty-gritty is being sorted out.

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Row over plans to split PO's DP section

A ROW broke out last week between Post Office unions and the Post Office over plans to split up its DP section as from next month.

Further strike action (CW, June 21) was taken at a number of PO centres by members of the Society of Civil and Public Servants, and the Civil and Public Servants Association.

On Friday, 90 operators were called out at the St Albans, Herts, centre, where an ICL System 4 is used to run postal and commercial applications, and to provide an online service to PO development centres.

Other sites hit by the action included the Giro centre at Bootle and centres at Cardiff, the Barbican in London, and Docos House, where about 400 systems and programming staff are employed. These centres have now returned to work.

The action came at a time when the Post Office pay and grading dispute was in its 14th week, with the telephone billing backlog at some £500 million.

The PO plans, as outlined in a letter to the Council of Post Office Unions last week, include the following points of contention:

- The setting up of a Data Processing Executive to handle the computing requirements of the PO's telecommunications branch; and
- The Giro centre in Bootle becoming part of the National Giro Bank.

Racial success at Milgo

SHOWING that it has not lost the magic touch, Racial has not only doubled turnover to over \$80 million at Milgo Corp in the two years since it bought the US modern manufacturer, but enhanced profitability to the point where it approaches the 27% on sales achieved by the Racial group as a whole.

Overall, in the year to March 31, Racial made pre-tax profits of £81.8 million, up 23.7% on turnover up 23.6% at £228.7 million.

Racial said that it would be interested in acquiring the National Enterprise Board's 50% stake in Ferranti (CW, June 7). Ferranti's figures, also to March 31, are decidedly dull, with profits up only £800,000 on last year's £9.1 million, although turnover was up 22% at £192.1 million.

Profits were hit by a loss at

Canadian subsidiary Ferranti-Packard. Underlying Ferranti's position as UK number two in computers, the computer systems division made profits of £4.3 million, up 43%, on turnover of £57.8 million, up 25%.

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Briefing 4300 delay in Germany

GERMAN customers for IBM's 4300 line are miffed because they still have not been given a delivery date for the machines, although customers in the UK and Italy know where they came in the delivery ballot, and first shipments have already begun (see back page).

Particularly galling to users in West Germany is the fact that the 4300s are built in their country for the European market. The uncertainty has caused prices for used 370/138s to harden considerably in Germany. IBM says that its customers there will be given delivery dates shortly.

PDP-11 packs

A DATABASE management system and two application packages for DEC PDP-11 machines running under RSTS/E have been launched by Comtech Ireland, a subsidiary of the Toronto-based Comtech Group International. Called Sage, the package is written in Macro-11. The application packages, written in Basic Plus, comprise Creditmaster, a sales analysis system, and Sales Success, a marketing information system.

Copyright writ

A HIGH Court writ is understood to have been issued by Safe Computing alleging breach of contract and breach of copyright by a former employee. If, as seems likely, the case comes to court, it will be the first case involving software copyright to be heard by an English court.

Abandoned

THE proposed joint venture between Plessey Semiconductors and General Instrument Microelectronics of the US has been abandoned. With the appointment of Dr Melvin Larkin, previously chairman of Motorola (UK), as head of its components division, Plessey is now preparing to go it alone in the semiconductor business.

£100,000 raid

FOLLOWING a £100,000 raid on the National Westminster Bank in Small Heath, Birmingham, the Banking Information Service, which is a collective spokesman for the "Big Five" banks, has called for money to be transferred on paper or by EFTS. A spokesman said that there was always the risk of computer fraud but in such cases "people don't get hurt".

Briefcase micro

WORKING with Allied Breweries, Raytheon's UK subsidiary Data Logic has developed a portable microcomputer the size of a briefcase. It has been designed for use as a pub stocktaking system, though development work is continuing to produce a general purpose machine. Full story in Micro News, Page 14.

'Be brave' call to employers

EMPLOYERS need to be encouraged to be brave. That is the message of the new chairman of the BCS Specialist Group for the Disabled, succinctly summed up the employment of disabled people.

She spoke of the increasing number of ways in which computing applies to the disabled. On the other hand, microcomputers were making it possible for more people to work in computing even if they are housebound, while at the same time the use of computers as aids allowed the disabled to work in many other fields.

The specialist group's aim is to develop employment possibilities for the disabled in computing. Representatives of government departments and of organisations for the disabled were among guests at a lunch at BCS headquarters in London last week, which marked the chairman's taking office.

A range of electronic aids for the disabled was exhibited, including Mavis, seen in our picture, a microcomputer-based device.

Leo DME points the way for ICL

UNDERLINING the power of ICL's microcoding techniques in expanding the potential customer base for the 2900, the company is developing a DME emulation of the aged Leo 326 machine.

Understood to have been developed especially for the Post Office under a contract worth over £1 million, DME/326 is expected to join DME/1900 and DME/System 4 on the 2980. It will enable the Post Office to run its regional telephone billing and payroll applications on modern hardware.

The Post Office Data Processing Service still has seven of the English Electric-Leo-Marconi Leo 326 machines handling these applications, and has been

seeking the most cost-effective way of continuing the present decentralised processing. Commissioning ICL to write the necessary microcode to enable them to run on 2900s proved the most appropriate.

This is the second time that the Post Office's requirements have caused a major effort to be devoted to Leo machines. In the late 1960s, the Leo 326 production line was specially reopened because the Post Office wanted more Leos.

DME/326 is unlikely to be of much value to ICL, because there is only a handful of Leo machines still in service around the world. The significance of the development is to underline the ease and low cost which

would be involved in writing DME emulations for the machines of many of ICL's competitors.

ICL is non-committal about whether it intends to use new DMEs to spearhead raids on the installed bases of its competitors. "We are doing a lot of work to ensure an increasing share of the market, including gains from competitors, and are constantly reviewing our product strategy to meet our growth objectives," ICL told Computer Weekly earlier this year, adding that it had no comment to make on the possibility of DME for competitors' machines (CW, March 8).

The most obvious candidate is clearly DME/370, and it would be surprising if ICL does not already have such an emulation running experimentally. Since 2900 is a 32-bit machine, it would also be easy to do DMEs for the Univac 90 series, and the Siemens 7700 line, both of which are descended directly or indirectly from the RCA Spectra 70. System 4, for which DME is already available, was little more than the Spectra 70 built under licence by English Electric.

INSIDE THIS WEEK'S CW.....

BLURRED BOUNDARIES

As with most other areas of the computing scene, the micro has made significant changes to the peripheral and terminal market. The power with which these devices can bring equipment that was previously a mere appendage to a system, has blurred the boundaries between processor and peripheral. This week's special section looks at some aspects of the peripheral and terminal market. Pages 17/20

PALACE BOUND

The swarming and straining in the heat is over and throughout the country this year's Computex '79 has ended. We are preparing for the grand final at Crystal Palace as the end of September. The last finalists were sorted out on Saturday. Page 23

ALSO.....

- Computer on price of power
- Focus on alternatives
- Post Office in action
- Downline by Chas
- CDC and DRI in link-up
- IBM rent and lease prices
- Mid-range models from
- Madame
- Gill's Mythology
- Programmer Notes
- Software File
- Puzzler
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- Future of word processing
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More UK motor firms go to Amdahl

CONSOLIDATING its position as a major supplier to the UK and world motor industries, Amdahl has just announced two UK orders for the large-scale 470V/7 mainframe.

The customers are BL Systems and Massey Ferguson, which join Ford, Rolls Royce and Chrysler as Amdahl users in the UK. Chrysler and associated companies also have Amdahl machines in France and the US, while Ford has 470s in Germany and the US.

The 8 Megabyte 470V/7 at BL Systems replaces two IBM 370/158s and will run alongside an IBM 3033 at the company's Redditch computer centre, providing remote batch, time sharing and IMS online services to the Austin-Morris, Jaguar, Rover-Triumph, and BL Components divisions.

Massey-Ferguson Holdings has chosen a 32 Megabyte 470V/7 for its new European Data Centre in Birmingham, where it will handle extensive online teleprocessing and general DP applications.

Itel may sell DP division

AN announcement by Itel last week that second quarter losses could amount to £10 million, due entirely to losses in the Data Products Group, has given rise to speculation that the division may be sold. The company is due to meet its principal bankers today (July 6), after which an announcement is expected.

If the Itel computer operations were offered for sale, acquisition by Hitachi would give the Japanese manufacturer a short-cut into the US and European markets.

Siemens and Philips step up bids for personal market

PHILIPS is plunging into the personal computer market with its G7000 Videopac Computer, due in the shops this week at about £150, and aims to sell 150,000 units this year. Siemens is expected to follow suit later this month, although in a higher price bracket, with its

PC100 priced at about £600. This is designed as much for process control and commercial applications as for personal use. Philips is building on the television games market and aims to make it easy for people

● Turn to page 15

There are not enough words to describe

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ENSDIME

JOB OPPORTUNITIES: PAGES 24-55

Downtime

by Chad

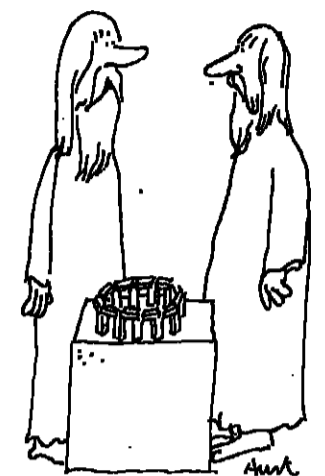
Sole-searching

THE latest bright idea for using computers to increase the sum total of human happiness comes from the Stockport Odd Feet Association. In case you are not acquainted with this organisation, I can tell you that it aims to help people whose feet are different sizes, and who therefore need always to buy two pairs of shoes, thanks to the helpfulness and consideration of shoe companies and shops that will not sell broken pairs.

The idea is to use a computer to match up people whose feet correspond, so to speak, so that they can swap shoes and thereby save lots of money. To this end the association has received a grant of £300 from Greater Manchester Council, and on what better cause could public money be spent?

The only trouble I envisage is, what happens when you go to the shoe shop with your newly acquired paw partner

and you discover that he wants to buy brogues and you had your heart set on brogue creepers? I suppose the program will have to take taste into account as well as size.



"We've miniaturised our astronomical computer."

CDC and DRI link to sell new drive worldwide

A DISC DRIVE currently under development at Data Recording Instrument is one of the products to be built by the joint manufacturing company being set up by DRI and the Control Data disc manufacturing subsidiary, Magnetic Peripherals Inc (CWI, May 3). According to DRI the new drive will be sold on a worldwide basis by DRI and CDC.

No information about the new product has been announced yet, but an 8-inch hard disc drive looks the most likely candidate, because most of the other manufacturers of small disc drives have already introduced 8-inch units.

DRI and CDC are the two major firms in this market that have not announced 8-inch drives.

The 8-inch units already available are as compact as 8-inch floppy disc drives and provide much higher capacities, but they present the serious problem of non-exchangeability of the media.



Former vice-president of engineering at MPI, Larry Matthews has been appointed managing director of the new DRI-CDC joint venture in the UK.

For that reason an 8-inch unit with a removable cartridge as well as a fixed platter could be well received by the market.

The first two products to be manufactured by the new company will be existing CDC units. These are the 9427H cartridge disc drive, which comes with

one fixed and one removable platter each holding six Megabytes, and the 9448 cartridge module drive which combines a 16 Megabyte front loading cartridge with 16, 48 or 80 Megabytes of fixed disc capacity.

Both products are already built in the US at the Oklahoma City plant of MPI, but MPI needs additional manufacturing capacity to meet the demand for the 9427H and 9448, otherwise known as the Hawk and the Phoenix.

DRI's marketing company, Data Recording Equipment, will sell both products in Europe in competition with CDC's sales force, although neither side envisages that this will create serious problems because their co-operation is in the area of manufacturing rather than marketing.

The new manufacturing company will be 76% owned by DRI and will be funded to the tune of \$8 million by the National Enterprise Board which owns DRI, but MPI will exercise a high degree of control of its management.

The managing director of the new company is an MPI man, Larry Matthews, who was formerly vice-president of engineering at the MPI plant at Normandale, Minnesota. He is moving to the UK later this year.

The new company still has no name, although United Peripherals Ltd is favoured, and MPI and DRI are rather vague on the moment about its future size. DRI chairman Henry Sweetbaum said that it would employ "several hundred people, maybe more" and predicted that its turnover would be £80 to £100 million within five years.

The new company will reside in a significant expansion of its DRI workforces at its two main centres at Staines and Cress particularly the latter.

The legal obstacles to a MPI/DRI deal going through were settled some weeks ago (CW, May 31) when Industry Minister Sir Keith Joseph approved an outlay of about £1 million to buy out the 1% shareholding in DRI held by Grundy (Teddington) Ltd which had objected to the venture.

GA claims 20% fuel savings from energy management system

CAPITALISING on its experience in the numerical control, industrial automation and factory data collection markets, General Automation is promoting the concept and using the growing pressure for energy conservation to spearhead its drive.

US experience has shown that computer-based energy management systems can pay for themselves in as little as six months, cutting between 10% and 20% off a company's annual bill for electricity and other forms of energy.

The approach and the savings

depend to some extent on the way the power company computes its charges, but in general it is more economical to spread the power demand evenly through the day rather than create periodic peaks.

The key elements of the system are a microprocessor-based data gathering unit, the Micro-dac, which can handle up to 544 monitor and control points, and a central minicomputer, typically a GA 16/440.

One of the Big Three car manufacturers in Detroit estimates that the system will save \$1 million on energy bills over 18 months.

As well as shedding non-critical loads during periods of peak demand and switching off things like heating, ventilation and air conditioning systems when they are not required, the system also builds up a wealth of statistics on energy use, as well as a historical record of weather patterns around the plant which can be used subsequently to fine-tune the system.

Installation of an energy management system creates something of a Trojan Horse for General Automation, for once the central computer is in place, the incremental cost of adding a host of other facilities becomes

attractive. Factory data collection terminals, time recording equipment, centrally administered process control and other facilities can run alongside the energy management software on the same computer, and the company has networking software which enables all the terminals, as well as satellite computers, to be linked together.

For the future, General Automation is working on a more advanced numerical control system than is at present available, where instead of the numerical control programs being loaded on paper tape close to the machine, programs can

be entered, modified and programmed monitored from the central computer.

In anticipation of much stricter legislation on permissible working environments, environmental monitoring and control will be added.

As well as providing higher levels of plant security, access control systems can build up records on each employee, showing how much time has been spent in each part of the plant. This could be particularly valuable where an unexpected health hazard comes to light and it becomes necessary to screen employees for exposure.

Dow Jones debut

IN belated recognition of the key role played by the computer industry in the US economy, the Wall Street Journal has added IBM to the 30 shares whose price movements are computed daily to produce the world-famous Dow Jones index.

It is the first revision of the stocks making up the index for 20 years and is designed to reflect the importance of technology.

Operator in £1,976 bank fiddle

A BANK computer operator who syphoned off money from local businessmen by manipulating the computer, was "milked customers whenever the mood took her", a Crown Court was told last week.

Christine Palmer, 22, of Basingstoke, who admitted stealing £1,976 from Barclays Bank at Basingstoke, in what was called a "deliberate and cunning fraud" was given a two-year suspended sentence.

Recorder Robert Johnson QC told her, "I feel that I am imposing a sentence that is wrong. People who take large sums and have suspended sentences are, in the eyes of the public, getting away with it."

Asbestos danger

AES WORDPLEX has been forced temporarily to stop using its warehouse in Reading following the discovery of blue asbestos material in the roof. Wordplex has called in a specialist firm to carry out the costly operation of removing it.

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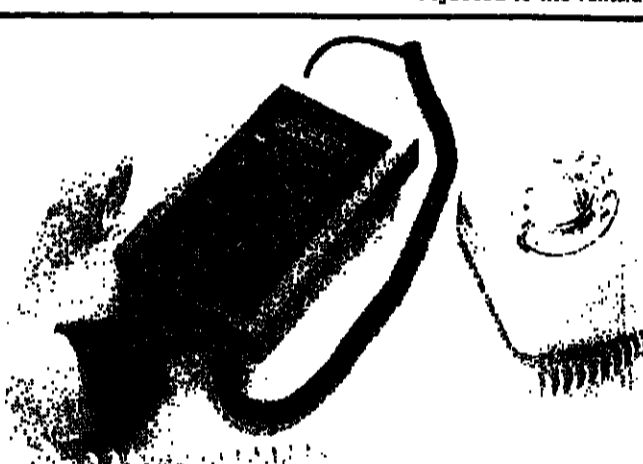
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The Memoport portable data terminal, connected to an office terminal via the acoustic coupler.

Hand-held terminal for data capture

HAND-HELD data capture for a range of applications is the purpose of a terminal introduced into the UK last week by British Brown Boveri, a company more closely identified with the power industry.

Already in use on the Continent for about a year, the Memoport is a portable unit based on RCA's 1802 Cosmac micro and operating off an internal, rechargeable battery pack.

It demands little of the user, as the keyboard has limited functions and the user need only key in the relevant item code - for example, a supermarket product article code - which is then stored within the unit's memory.

Standard memory sizes are 1K of program and 2K of data storage, but the company says these figures can be quadrupled if required.

The Memoport comes with an acoustic coupler and this allows captured data to be transmitted at up to 600 baud over normal telephone lines to a central processor. Data protection is said to be high (one error in every six months of operation) whether the information flow is accomplished over ordinary communications lines or via satellite switching.

Optional extras at present are a portable thermal printer, and a light pen for bar code reading.

The display is a 12-digit liquid crystal type which enables the user to verify each entry visually before it is

stored and to modify or erase data already in memory. The battery pack gives between 10 and 20 hours of power depending on the level of memory protection required after the machine is switched off. Protection is between 100 and 600 hours respectively.

A 100-terminal Memoport system featuring Brown Boveri's own Memoport processor, and including features such as VDUs and line printers would cost about £100,000.

● A new application has been developed for UCCL, Midcom's M50 hand-held terminal, which has so far seen use in warehouse or retail stores.

Now part of a package offered by Eclipse Computer Services of Milton Keynes, the M50's facilities are being turned to aiding the purpose of replacing his traditional notebook and pen, and writing down pencil notes on a site, he inputs them through the terminal's keyboard.

At the end of a site visit, a surveyor then transmits the stored data to a central processor for analysis.

The Eclipse system comprises M50 terminals, a minicomputer, a flat-bed plotter, VDUs and high-speed printers and was originally developed for Aworth Laboratories, Morden.

Price of a two-terminal system starts at about £10,000, while a more powerful MVP processor-based system can be £45,000.

IBM raises most of its leasing and rental prices

IN a move to avert the threat to its profit margins from the strong trend towards leasing rather than outright purchase (CW, June 21), IBM has raised the lease and rental prices of most of its products, including some software.

The announcement caught industry analysts on the hop, because most of them were predicting purchase price reductions, particularly on the large 303X machines. These are now expected to be deferred until early next year.

Although the move will bring some relief to Amdahl and ICL, whose profits are under attack because of the strong trend towards leasing, price cuts which encouraged purchase would have been much more welcome.

The price increases affect all rental and lease contracts and cover almost all products from both the Data Processing and General Systems Divisions apart from those announced after October 1, 1978; the latter category includes System 38, 4300 and 8100. They apply to peripherals as well as CPUs, and are also applied to most System 3 licensed programs, including compilers.

For software, the increase is 10%, while for the hardware it is "up to" 8%. The price increases took effect on July 1 except where lease contracts specify a minimum period for notification of price rises.

Price restraint guidelines in the US limit the increases there

to 5%, and different levels have been set for various European countries.

Commenting on the move, Aharon Orlansky, of brokers Dean Witter Reynolds, thought that it would enable IBM to show an increase in fourth quarter profits over the same period last year, and allow the company to show a profit growth for 1979 as a whole.

"What has been forgotten is that IBM also needs to protect its profitability for 1980," he noted.

"Everyone has hailed the big boost in orders that IBM has taken without considering that the bulk of them are for new technology products for which IBM's production capacity is limited. If IBM cannot fill all those orders next year, they will not show up in the figures and the company needs a new source of revenue - hence the price increases.

"The move will bring home to users the fact that rental and lease contracts are subject to inflation, and there could be some psychological switching to purchase, but the tendency will still be towards leasing.

"If you calculate the price per MIP, you find that it is \$300,000 on the 4300 but \$900,000 for the 303X. Users have to assume that when the H-series appears to replace 303X, it will also be priced at around \$300,000 per MIP - and that means that the residual value of a 3033 in four years' time will only be 15% of its current price. That is a very

Modcomp introduces two mid-range models to Classic mini family

MODCOMP has added to its Classic minicomputer family with two mid-range models, the 7830 and 7835, with features that include 128K bytes on a single memory board. The company has also made several other new product announcements, including new tape and disc drives and two software packages, a time sharing executive called TSX and a database management system called Infinity.

The 7830 and 7835 are both compatible with Modcomp's Max III and Max IV operating systems, and the 7835 is the same as the 7830 except that it includes an arithmetic accelerator which provides high speed floating point operations.

The new machines fit into the Classic line between the 7810, which is available in single board microcomputer form, and the bigger 7860 and 7870.

For users of the 7860 and 7870 shared multipoint memory, SMM, system, said to be the first of its kind in the minicomputer industry. The SMM system can

connect to the memory buses of up to four 7860s/7870s, enabling them to share up to four Mbytes of memory.

According to Modcomp the TSX package is a general purpose time sharing executive and transaction processor that is transparent to standard Modcomp operating systems and to most user written terminal-oriented application programs. It dynamically schedules memory usage to allow any number of interactive users to perform concurrent processing.

The Infinity database management system supports multi user access to database files through the standard operating system's logical I/O structure. It can also support distributive database management configurations if it is used with Modcomp's Maxnet communications software.

The company has also introduced two moving head disc drives, the 4173 and 4174, and a magnetic tape subsystem, the Model 5550.

good reason not to buy one."

Orlansky also felt that the January launch date for the H-series could now slip to March or April, 1980.

"IBM has been imposing stringent cost controls through-

out the company because of the threat to its profits, and this could include a cut-back on development budgets, which would delay the H-series development program and with it the launch."

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COMPUTER MARKETING

GILB'S MYTHODOLOGY

Using the Function/Attribute Table for maintainability design



IN the last column I showed how to explode a system maintainability objective into detail, in a measurable way. In this one, I will go one step further and show some of the design decisions which I would make to support those goals.

In the design specification list (see Figure 1) I have suggested 12 design rules which I hope and believe will help my system meet its design goals. I have assigned each of them a reference code. It would be outside the scope of this single column to explain each of these design rules, although many of them have been handled in earlier columns or are explained in my books.

The formal source of these design ideas is a Technique/Attribute Table, which is a list of design possibilities together with information about their effectiveness. Every experienced professional has such a T/A Table in his memory. Some of us write our know-how down, the better to review it and share it with others.

Do you think that this list of design specifications will produce a system capable of

meeting the maintainability specifications laid down in the previous column? One of them was that problems should in the worst case be identified within 24 hours, and in the planned case within an hour. Will the database audit program (M.DBA) solve that problem for errors which develop in the database?

The answer is no; we must specify that the database audit program must be run at least every 24 hours. And that is not the end of it, but our goals remind us that we must make further design specifications if we are predictably to reach them.

As a first analysis tool to help us understand the consequences of our design decisions, I would like to show you the Function/Attribute/Component Table (see Figure 2) or F/A/C Table. The primary mission of an F/A/C Table is to give an overview of

design decisions in a complex system. In this case we see which maintainability objectives are affected by design decisions, and which system functions (hardware, files, programs, people) are affected by those same decisions.

Most important, we can see that the design process is clearly incomplete in several areas. These are the blank intersections — red-flag warning signals which remind us to do something constructive.

It is possible that some of the design decisions we have already made do in fact impact some of the "blank" areas. The blanks force us to ask the question, and to record the answer if they do have impact. We begin to get a more complete overview of the design consequences.

It is worth mentioning that both the design specifications and the functions can later be "exploded" for more detail and for more precise definition. In addition the functional breakdown I have shown here is only one of many possible breakdowns or architectural viewpoints. I can choose another viewpoint in addition, if this interests me. For example, Present Systems, Purchased Future Systems, Future Developed Systems-In-House.

The F/A/C Table also serves as a checklist for a more quantitative evaluation of the design decisions using a Quota/Control table which I shall explain in the next column.

The concept of the F/A/C Table is derived from cost/value engineering methods. It was first proposed and used by Barry Boehm of TRW as "Requirements/Properties Matrix" (see IFIP 1974 proceedings) and the F/A/C Table is an adaptation of this concept.

The original problem which Boehm tried to solve at TRW was that of having to reprogram up to 80% of high-quality software projects before acceptance tests were completed. This resulted from the programmers trying to code programs based

Attribute	Functions				
	Application programs	Utility programs	Database	People and organization	Hardware
Problem recognition			M.DBA, RLH, M.MPG, RC		
Administrative delay				M.TEL	O
Tool and document collect	M.TXT, M2PG, M.LIB	M.LIB	M.LIB	M.LIB	M.LIB
Problem analysis		M.AST		M.MPG, AST	
Change specification	M.2PG			M.MPG	
Active correction	M.2PG		M.2PG	M.MPG	
Local correctness test	M.AST	MAST			
Global side-effect test	MAST, DBA, RLH	MAST, DBA, RLH	M.INS	M.INS	MAST, RC, RLH, DBA
Independent change audit	M.INS	M.INS		M.INS	O

Note: see Design Specification List for explanation of codes (Figure 1)

Figure 2: The Function/Attribute/Component Table.

on incomplete design specifications.

The reason for incompleteness was that the designers were making specifications without the overview given by an F/A/C Table. They made a lot of correct decisions, but they could not easily determine if the decisions they had made would be complete enough to meet the quality levels stated in software contracts. The blank spaces on

the F/A/C Table were the simple reminder and review overview that they needed. It would be too much of an ivory tower project simply to work out the maintainability effects of the design decisions made for maintainability. Of course we are interested in the cost effects and any other positive and negative side effects which these decisions have on the total design. We

must therefore be prepared to do a similar analysis job with only F/A/C Tables which lack these system properties. If all this seems like a lot of "extra work" to you, I remember the TRW lesson: extra work, but it is far more costly to have to re-do the system at a more detailed level cause you have constructed a system based on incomplete design specifications.

PROGRAMMER NOTES

More than mere specialists

PROGRAMMERS are the DP manager's biggest headache. They take an irritatingly narrow view of their responsibilities; they place too great an emphasis on technical expertise; and they have an inflated view of their importance. They cause needless problems in the operations room, and create a poor impression of the department among its users.

Highly provocative words, undoubtedly. This argument was somewhat forcibly presented to us the other day by an acquaintance who was obviously suffering from high blood pressure. So were we at the end of it, but on mature reflection it does raise interesting questions about the role of the programmer in the commercial installation.

For example, the programmer is conventionally a technical specialist, who keeps within the confines of the computer department and has little contact with users. Should this not change, and the programmer assume something of an evangelical role, benevolently spreading the good word about computers?

Of course if they do, development work is going to be delayed, and as all such work is always required yesterday if not earlier, the howls of protest can be imagined. On the other hand, these unreasonable demands are made precisely because their perpetrators do not understand either computing in general or programming in particular.

If programmers had spent more time explaining the computer's potential, perhaps the general view of the computer as something which can do anything on demand would not exist. And the odium which so many computer departments suffer would not exist either.

Another point: in too many installations the allocation of machine time to programmers is a constant source of friction. A good programming manager, in conjunction with a reasonable operations manager, can of course overcome this.

But to rely on good management is to sidestep the issue, and in any case an unwise proceeding. Too many managers just aren't good at managing. In that case diplomatic skills are required to ensure that the programmer gets a reasonable slice of the action.

And why shouldn't program-

mers have diplomatic skills? There is a persistent myth that programmers are (and should be) introverts — command C. Cobol is essential, command E. English is optional extra. Readers of this column will need telling just how silly that is. These thoughts lead to the conclusion that the programmer should be something more than a technical specialist; they should develop his communications skills and adopt a more dynamic role within the organisation. And if the logic is convincing, perhaps there is more powerful incentive.

The pundits tell us that commercial programming will eventually disappear, as technology evolves to take over its functions. Technology will never evolve so as to take over human functions however, and good communicators are always going to be needed.

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SOFTWARE FILE

Dol backs Phase 2 of Project Gamma

THE novel idea of generating application programs directly from a system design database is at the heart of Software Sciences' Project Gamma, the second phase of which is being backed by the DoI's Advanced Computer Technology Project (CW, June 28).

ACTP has put up £150,000 to help complete the development, with an equal sum being contributed jointly by Barclays Bank, Standard Telecommunications Laboratories and Software Sciences itself.

The current phase is now scheduled to end in 1980 with the completion of a working system which will generate IBM 370 assembler code. It will then consist, in software terms, of four main components.

The core component is the system design database. Somewhat like a data dictionary, this is referred to by Software Sciences as a "construct network database" and defines the relationships between system entities ranging from lowest level components, such as integers and dates, up to conceptual level constructs, such as a class of files.

The idea of a construct also

embraces processes, ranging from individual tasks and algorithms up to the level of an application suite.

The database is constructed and maintained by what Software Sciences calls a "front end" processor. This reads design statements written in a high level language called Gamma in which the construct network is expressed.

Then, from the machine-held representation of the design, a two-stage generation process is invoked to create a program.

The first and major step is the generation of a version of the program written in an intermediate code. This is followed by the translation of the code into a real programming language — in the first instance, IBM 370 assembler.

Gamma thus provides not only a tool for managing design information but also a means of generating software directly from the design, eliminating the programming stage entirely.

Figure 2 represents the operation of the Gamma database as contrasted with the conventional development process (Figure 1).

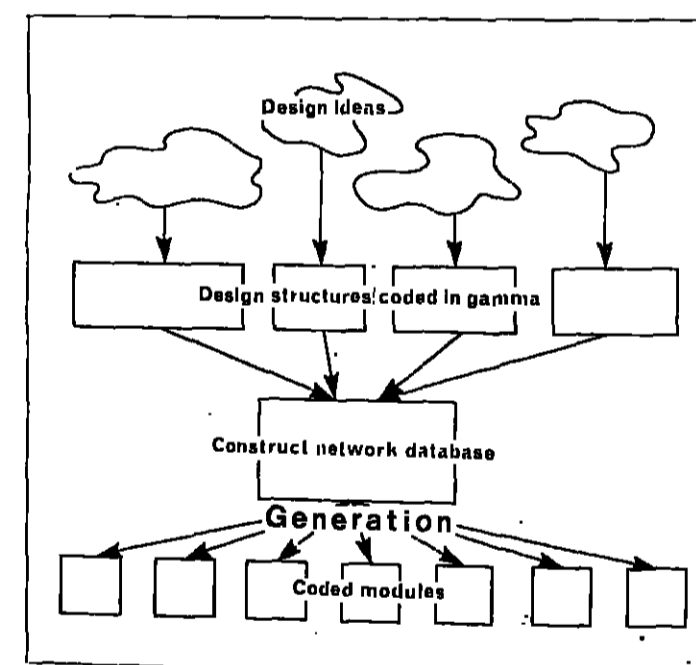


Figure 2: Gamma development process.

Tandem gets Mumps

THE popular interpretive language Mumps has been implemented by Tandem Computers for its Non-stop system. Fully compatible with the Ansil 1877 standard, a feature of the software is that it will run concurrently with any other work under Tandem's Guardian operating system. It will be available in January.

Tandem has also added 3270-compatible access methods to its communications package Access; AM/3270 provides an interface between application

programs and a 3270-type terminal, while TR/3271 allows a Tandem system to be connected to a host by emulating a 3271 cluster controller.

All the software is unbundled, with AM/3270 and TR/3271 priced at £1,350 and £2,700 respectively. Mumps costs £4,700 with an additional microcode charge of £1,340 per processor, while a previous Access feature — X26/AM — has also been unbundled, now carrying a licence fee of £1,350.

Puzzler

WHILE on holiday recently, I popped into the local hostelry for lunch, and stayed on until three o'clock. As I left, I noticed that the hour hand on the pub clock was pointing to 6 instead of 3.

That night I went back to the same pub, and during the course of the evening happened to glance again at the clock just as the nine o'clock news started on a TV behind the bar. On this occasion the hour hand was

pointing exactly to 11.

Naturally I immediately raised this important subject with mine host, but he averred that the clock always kept perfect time, and that none of his regulars ever had any trouble reading it.

To which number was the hour hand pointing at midnight, when the pubman was finally able to eject the last of us regulars? See page 53 for solution.

By Peter Hewitt

Hoping to repeat success

PROMPTED by the outstanding success of its West German subsidiary set up 18 months ago, Johnson Systems has established a similar subsidiary in the UK, which in the first instance will be selling its IBM DOS and OS Job Accounting Report System, Jars.

Jars was sold in the UK by Computer Associates up until three months ago, when the company switched to selling Jasper; this is the job accounting system on which CA has standardised worldwide, following its acquisition of the company which developed Jasper, Datachron Corp.

Jars has been a highly successful product for Johnson, which made over 400 new installations in 1978 alone. In the UK there are already around 80 users.

Johnson Systems (UK) is at 10 Station Road, Watford, Herts.

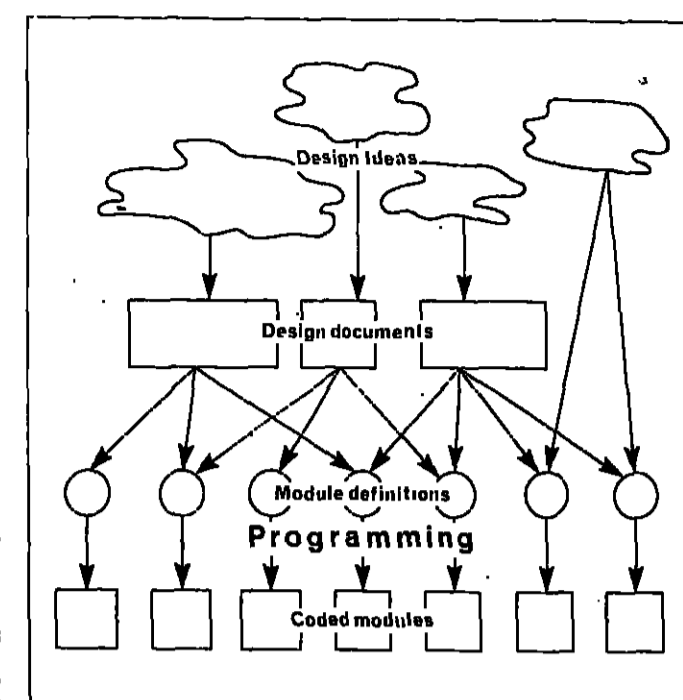


Figure 1: Conventional development process.

and could be of particular interest to suppliers of customised application packages.

As yet, though, Software Sciences has made no decisions

over the future marketing of Gamma, which will depend both on the outcome of the present development and on commercial considerations.



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A. MSA provides a complete range of application systems covering cash management, financial management and personnel management to more than 3500 companies around the world.

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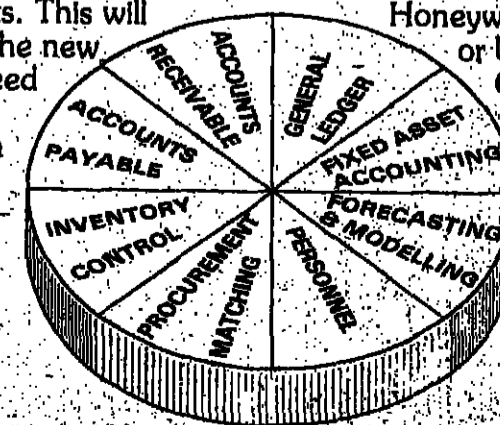
A. (see diagram).

Q. Who can use MSA?

A. Anyone in manufacturing, banking, insurance, building societies, distribution, transportation and Government utilising IBM, ICL, Honeywell, Burroughs, NCR or Univac hardware.

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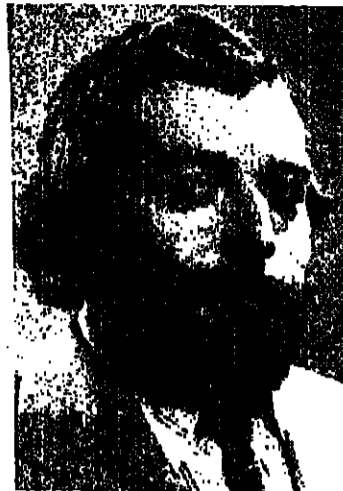
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OP SPOT

Calling
Dave
Whitfield

Dave Whitfield

OP SPOT would like to hear from Dave Whitfield, formerly an operator at Barclays Bank's Harlesden centre which has now re-located to a site in Gloucester.

The last I heard of him, he was on a contract with Centraal Beheer, an insurance company based near Amsterdam.

If anyone knows where he is at present, would they please contact me on 01-261 8035.

OP SPOT'S Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations. Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 8LU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-261 8035.

HINT OF THE WEEK

Deleting O/P under
Honeywell OS 2000

BY popular demand we have this week a hint which relates to an operating system other than those of IBM and ICL.

It concerns the use of job control language as a means of deleting output in the Honeywell OS 2000 environment. The author is Alan Friedler, an operator at Desouters in Colindale, North London.

He writes, "Disksort under OS 2000 produces a couple of pages of print no-one wants, so the operator has to delete each one manually."

To do this, the operator has to type two commands in at the console. To ascertain that the listing is on the output file, he enters:

M/D71-J=JOBNAME

In response, the system will send the operator a message informing him whether or not the listing is on the file. If it is, he enters:

M/D71-D

The "D" stands for delete, and so the system deletes the listing from the file.

A better method which, according to Friedler, is not mentioned in any of the Honeywell manuals, is to include the following piece of coding in the Disksort JCL:

```
COLUMN 6,7      15.      21.
//              EXEC      DISKORT....S.
                  SORT      INFO=NO
```

He goes on, "The card with the slashes (//) in columns six and seven relates to the system supervisor. The four commas and 'S' are not usually specified."

"The second card relates directly to the Disksort program. The 'INFO=NO' parameter instructs it not to produce a listing."

Bank and union negotiate
on seven-day shift allowance

WILLIAMS & Glyn's Bank plans to implement an online cash dispensing system, but the operators at the bank's London centre have expressed reluctance to work the seven-day shift pattern needed to cover it.

And talks are in progress between the bank and the Banking Finance and Insurance Union (formerly NUBF) over the shift allowance to be awarded to the operators.

The union is negotiating for an allowance of at least 30%, with a fixed minimum of £888.

At present, the 40 operators at the centre work an eight-hour, two-shift system, providing five-day cover. For that they receive an allowance of 25% of basic salary.

Staff at Barclays Bank recently accepted an allowance of 45% with a minimum and maximum of £1,131 and £2,888 for adopting a seven-day shift pattern (CW, June 7).

Ops who don't
want to be trained

OPERATIONS Manager: "How would you like a week in London, with no shifts, full pay, full board, and all expenses paid?"

Operator: "Nothing doing."

So ends an operations manager's attempt to send his staff on a training course — not as uncommon an occurrence as you might think, according to Ron Linton, operations controller at Manchester Polytechnic.

In a letter to Op Spot, Linton gives the "manager's viewpoint" on operations training.

"We have heard many comments from operators who are dissatisfied with the training they have been offered, but there exists in many cases an opposite problem — that of operators who do not wish to be trained."

Linton points out that while the single operator might jump at the chance of a course in London, the married person is likely to be less enthusiastic.

"A few years ago most operators were single, and glad of the chance to be away from the site for a while; now many have families and to be away is for them a great inconvenience."

An alternative is to bring the courses to the operators, but problems also crop up with that method.

He goes on: "Some training organisations will arrange a course on the customer's own site, provided that there are enough operators to make it worthwhile."

"This usually means two or



Ron Linton

three sites arranging to share the course between them. Unfortunately, this is often not possible."

Audio-visual courses are an alternative, "but while there are a number for programmers, those for operators are comparatively rare as far as I know."

The attitude of operations

staff is very important in relation to training. No matter how many courses are provided, if the operators are not interested, they won't learn.

"Every profession has people who are in it because it provides them with a convenient job. Such persons have little interest in personal development."

"This may be disappointing to the manager, but as long as they do their job he has no right to insist that they take a career interest — there are other things in life besides computers!"

Such persons are unlikely to gain anything from additional training because "as any lecturer knows, the slightest boredom will spoil the student's chance of assimilating information."

Linton points out that training opportunities are available and it is up to the operators to "bully" their manager into arranging courses for them.

On the other hand, if the manager is faced with staff who are uninterested or unable to spend time away from home, there is nothing he can do about it.

Display—a versatile and popular IBM OS command

OF all the IBM OS commands, Display is perhaps the most versatile and widely used.

By means of this command the operator is able to find out a considerable amount of information about the state of the system.

To save him an unnecessary amount of typing at the console, the command may be abbreviated to the letter "D". Here are some applications for it:

D Jobname

In response to this the system will relate to the operator the progress of the job specified. This can be very useful when dealing with user inquiries.

DA

All active jobs in the system will be displayed in response to the above command. This includes system tasks — readers, writers and initiators.

DN

This commands the system to display the names of jobs on the input and output queues. The operator is able to specify individual job classes, or display input or output queues only.

DD

This is similar to the previous command but shows the number of jobs on each queue instead of job names. It is useful for checking whether initiators (procedures responsible for allo-

cating system resources to job should be modified to serve different job classes.

DT

System time and date are displayed in response to this command.

DR

System messages which require a response from the operator — by means of either console reply, or a tape or disc mount — are prompted by the above command.

D Consoles

All consoles on the system in configuration are displayed in response to the above. It is worth study as it shows each console's back-up — the device to which its messages will be routed in the event of hardware problems.

Display is also widely used by the operator to find out the status of devices on the system configuration. He may specify groups or individual units.

He uses it in relation to TP lines, graphic devices, tape and disc units, and unit record devices — card readers, printers, printers and punch units. For example, to find out the state of the system tape units, he enters:

D U, Tape

In response, the system will inform the operator which units are offline and which are online, and whether or not they are active.

Glimpse into the
future of
word processing

TIME is expandable but buildings are not, so this year's International Word Processing Exhibition at Wembley Conference Centre will run over four days instead of last year's three. There was no room for any more exhibitors (42 at present), so the annual jamboree of the ever-expanding UK word processing industry will remain physically the same size.

Doubtless in future years it will follow Compec to Olympia, then Salisbury Plain — but it is predicted that WP will be leading DP before long.

As usual, Beta is running this year's show, which takes place between July 10 and 13 from 9.30 am to 5 pm (except for the last day when closing time is 4 pm). Free tickets can be obtained from Beta at 109 Kingsway, London WC2.

This year's conference programme, again put together by Online, is very much expanded, with eight different half-day seminars and two whole-day meetings. The short seminars deal with fairly specific topics in WP, such as choosing equipment, reviewing the latest technology, WP supervision, and specific applications.

The topics for the longer conferences are two old favourites, the human side of WP (The People Factor) and the Elec-

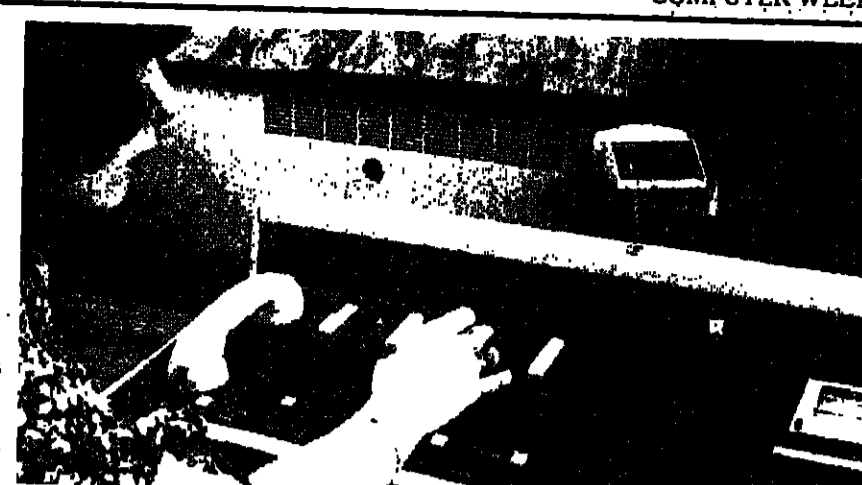
tronic Office of the Future, or OOF, as it is known to aficionados.

New faces among those talking will include Chris Ellis of Nexos, and Robin Dasey from the research department of the white-collar union Apex. Dasey has stepped into the shoes of David Cockcroft who was heavily involved in WP before he went to Geneva to work on the international trade union scene.

New faces among the exhibitors will be few. The last 12 months have been fairly uneventful in the WP arena: Nexos has appeared but has no products of its own yet and so will not be present, except as represented by Logica; some smaller firms such as Jacquard have been taken over by the giants who are keen to get in on a burgeoning field; but the old trade names have not been abolished. AES Wordplex has exposed itself on television, making a colossal hole in its advertising budget in the process.

Competitors can be glad that the idea of WP is being promoted at no cost to them, but won't be so glad if Wordplex succeeds in its avowed aim to make its name a synonym for word processor, as Hoover is for vacuum cleaner; it is making some progress here already.

Also this was the year when the unions,



Supervisor's console of the Dictaphone Thought Tank.

particularly Apex, discovered word processing, and the spectre of hordes of unemployed typists was spread abroad, but failed to convince employers who are turning to WP as the only solution to their staff shortages.

The most notable newcomer at the show will be ICL, which, with its 7700 Information Processor, will be aiming to convince the world that at least one of the big computer manufacturers understands what word processing is. The firm intends to demonstrate both electronic mail and large-scale filing by a link with a 1904S mainframe in Reading. The 7700 is claimed to be capable of both word and data processing, and visitors will be interested to see whether both these two widely differing tasks can in the event be dealt with properly and professionally.

New models of word processors being launched at this year's fair include the CPT 6000, which is a low-cost version of

the 8000 with black on white screen; the Amtext 425 from A M International, better known as Addressograph-Multigraph, which now owns Jacquard (also exhibiting); and Data Recall's Diamond 5, an upgraded version of the existing range.

A real glimpse into the future should be had from the xerographic Wang Image Printer; this non-impact, plain paper technology should become the standard office printing method if it can be made cheap and reliable enough. It is much faster and more versatile than daisy wheel printing, and is higher quality than dot matrix or ink jet.

Dictaphone will be demonstrating its computer-driven centralised dictation system, coyly named the Thought Tank, by which dictation by telephone from all over a building can be recorded and allocated to typists.

— RORY JOHNSTON

Computers
in schools
course

COMPUTERS in education will be the subject of a three-day course to be offered this month by Muse, Microcomputer Users in Secondary Education, at Westhill College in Birmingham.

Five speakers, including David Firnberg of the National Computing Centre, David Tinsley of the Birmingham schools inspectorate and John Coll of Oundle School, will give overviews on learning about computers and new developments, as well as how computers can be used to aid learning, before 15 workshops get under way on a more detailed level.

Subjects tackled in the workshops will range from control applications to history databases and will examine such projects as ED80, an assembly language for schools which consists of a subset of Z80 code as used on the Research Machines 380Z, which is becoming increasingly common in schools.

The course, to be held from Friday to Sunday July 20 to 22, will cost £30 including room and meals, with reductions for members and others involved in education. For further details write to Bob Trigger, 48 Chadote Way, Catshill, Bromsgrove, Worcs.

NEWS IN BRIEF

Competing for
MoD contracts

PLESSEY, Marconi and Hughes Aircraft have formed a new company, Ukadex Systems, to compete for contracts from the Ministry of Defence for a new display system, data processing equipment and communications equipment to link radar stations to operational headquarters.

According to Evans, Microm's sales last year of statistical multiplexers alone exceeded Frost and Sullivan's forecast for all types of multiplexer from all manufacturers. The company produces over 500 units a month with 15 per cent going abroad.

The multiplexers have done a power of good for Scicon, too. Having been set up with £8,000, the General Services Division produced £500,000 revenue in its first year and customers for the Micro800 multiplexer include: Borer Electronics and Master Systems, and terminal supplier Peripheral Hardware, have been appointed sub-agents.

A4 page in 20 seconds

A RANGE of new facsimile machines has been introduced by Kalle Infotech, including the model 6200 which can transmit an A4 page in less than 20 seconds, and the 460 Computerfax which has a standard V-24 interface enabling it to be used with multiplexing modems or message-switching computers.

There are also two units with built-in data scramblers, for transmitting secret commercial or military information.

Irish distributor

THE Irish subsidiary of Zeus Hermes has been appointed by Univas as the distributor in both Ulster and the Republic of the Univas BC/7 small business computer. Univas has sold over 100 of the Intel 8080-based business computers since the launch in April 1978.

Libra switch

IN a switch from the use of bureau services Libra Computing, a part of the Guinness Group, has invested in a Harris System 125 at a total cost of about £160,000.

TECHNOLOGIE DE L'INFORMATION

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SEPTEMBRE 1979

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et

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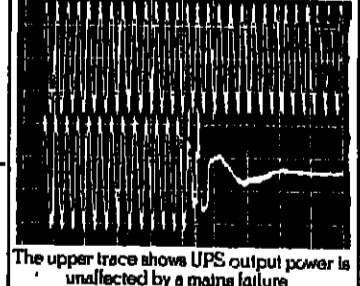
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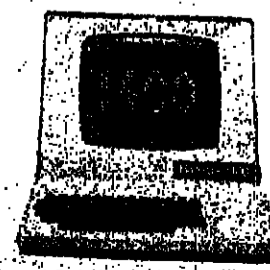
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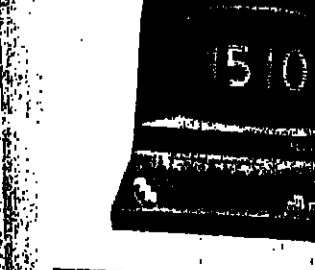
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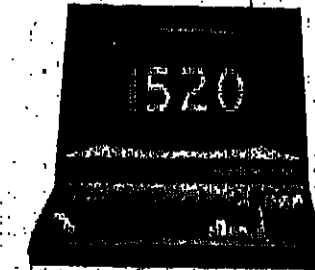
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Hon DSc for Tom Kilburn

A leading figure in computer engineering, Professor Tom Kilburn, has been awarded the honorary degree of DSc from Bath University. Professor Kilburn, who became professor of computer engineering at Manchester University in 1960, received an honorary doctorate from Brunel University in 1977 for his valuable work with computers, particularly his involvement in the development of several innovative systems at Manchester.

Dick Henry, Wyn Thomas and Martin Palmer have been appointed area sales managers for the commercial systems division of Computer Automation. Henry joins the company from Rediffon Computers, where he was a senior territory manager, and Thomas was formerly regional sales manager for Cable and Wireless. Palmer was a senior sales executive for ICL. All three sales managers will be based in the South.

Snily Carpenter has been appointed by Electronic Brokers as sales director, computers. She was previously sales manager for computers, and has been with the company for eight years.

Motorola names European manager

TAKING charge of Motorola's European MOS production centre at East Kilbride, Scotland, is Marc Lassus, who has been appointed general manager of the centre. Lassus, who has worked for the company since 1967, started the first digital device production for Motorola in 1970 at Toulouse, and since then has worked as digital products manager and European operations manager for linear products.

Paul Kinton has become Northern regional director of the data processing division of Honeywell Information Systems. He was formerly director of marketing services for the company, and in his new position will be based at Honeywell's northern region headquarters in Cheshire, Cheshire.

Joe McIlroy has become sales and marketing manager for Microware. He was formerly sales manager for Danish computer company, Kelti Kelti, previously development manager of Boeing's computer bureau, is now sales executive for Microware.

David McCaddon has joined Computer Machinery Company's Technical Support department in Birmingham. He was previously employed by ICL where he was a senior support technician.

Michael Hartley has joined BIS Applied Systems as a consultant, based at the company's Manchester office. Prior to this appointment he was a systems analyst with the British Gas Corporation and the North Western Electricity Board.

Malcolm Carter has become a sales engineer for ICL's systems sales, and will operate in the North of England. He was formerly an instrumentation field sales engineer. Kevin Wells will work in the South of England as sales engineer for the South of England. He used to be a salesman for Digital Equipment.

John Ring has been named as vice-president of the new word processing division of Dataproducts Corp. He joined Dataproducts in March when the company purchased the Plessey Peripherals systems printer division, which he had headed as divisional director.

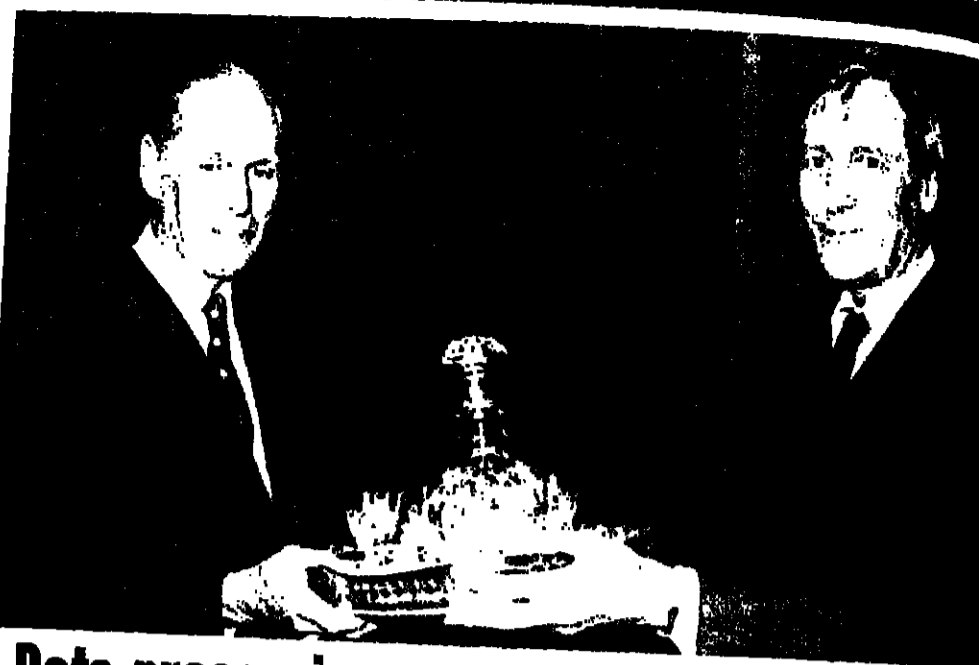
Chris Walford, previously a specialist salesman with Burroughs, has been appointed territory manager with General Computer Systems, to market the Qanet range of business and financial computers throughout South East England. Anthony Loades-Carter has also been appointed to a similar position. He was formerly a senior salesman with ICL.

Richard Neal has joined Rediffon Computers as senior production engineer. He was previously project engineer with EWPD. Roy Page has also become a production engineer, joining the company from Key-switch Relays, where he held a similar position.

Frederick McGeehan has become manager for Ireland with Hewlett-Packard. His responsibilities will include the formulation of the first five-year business plan for the company in Ireland. He has previously worked as a salesman and sales manager for ICL in Ireland and Canada.

Howard Dodds has become sales executive for FOCAS, the service offered by Lowndes-Ajax to fleet managers throughout the country. Dodds was formerly a technical sales executive with Applied Chemicals.

Peter Bowden Winder has been appointed to the board of Atkins On-Line as sales director. He will be based at the company's Epsom headquarters. His most recent appointment was as sales manager, where he held the post of divisional director.



Data processing manager of the year

"An example to everyone in data processing" is how the judges of the Data Processing Manager of the Year award described the winner, Bob Johnson, of Data Building Products, Birmingham.

The IDPM/Data Logic award is presented annually for outstanding achievement in data processing. Johnson has been working with computers since 1957, and won the prize on the strength of his effective and economic use of systems with improved customer service at no extra cost.

P & O changes

P&O Computer Services has announced that it will now become part of a new wholly owned P&O company, to be known as P&O Consultancy and Computer Services. It will be moving soon to new premises in Watford. For details ring Rick Mansworth 71111.

Sean Nash, a former RAF telecommunications expert, has become a sales manager for Rack Norex, the peripheral and software marketing company. He will be based at the company's offices in Bourne End, Buckinghamshire.



Maths marathon

A PROGRAMMER with Sora Consultancy International, Peter Durbin, has been chosen for the British team at the International Mathematical Olympiad, in Leningrad, from July 1-9.

Problem solving mathematical questions will be tackled at eight-hour final by teams of students from 22 countries. All competitors are under the age of 20. Durbin won a second prize at the British Mathematical Olympiad in 1978. He has been working as a management science divisional manager for the past ten months.

F International appointments

F INTERNATIONAL, the Chesham based software house, has announced the following appointments: Mary Bowley has become senior project manager for the Northern region, senior marketing executive for the Southern region is Sheena Inglis, a former systems engineer with IBM; former technical analyst with the Corporation of Lloyd's, Sarah Nurse has become senior project manager for the Western region as has Morna Brazier, who used to work for British Leyland as divisional systems manager for Austin Morris.

Johnny Johnson, until recently administration manager for Guardian Royal Assurance at Lymington, is now the computer operations manager for the company.

Peter Errington, a former sales manager with ITT, has been appointed by Armit (UK) as a sales executive. He will specialise in the interlock range of systems.

Alan Weston has become business planning manager of ICL, Dunsford, where he will be responsible for organising and reviewing the two and five year plans of the company. He was previously a financial controller with Gould, and before that a corporate planner with Ford of Europe.

DIARY

JULY 5-11 Consumer electronics symposium. Society of Electronic and Radio Technicians, University of Essex, Colchester.

JULY 11-13 Expert systems in the micro-electronic age. AISB summer school, Pollock Halls, Edinburgh University, Edinburgh, 8.00.

JULY 12 Education for the future IV: education by computer? ASE, CET, SCST, Bradford University, Bradford, 9.30.

JULY 15-19 Operational data security workshop. Operational Data Security Corp. Hotel Zurich, Zurich, Switzerland.

JULY 18 Who audits our freedom? IDPM. Pearl and Dean Studio, Broadwick House, Broadwick Street, London W1, 18.00.

JULY 18-20 IBM CUA Local authorities group. County Centre, Cambridge.

JULY 24-27 Workshop on program transformation. BCS Formal aspects of computing group. Imperial College, London.



Paul's heart in the right place

Paul Bennett, a computer operations manager at Rumbold's head office at Waltham Cross, receives the Silverheart award from TV star Angharad Rees. He was the top individual fund raiser in the British Heart Foundation's 1978 sponsored slimming campaign. Paul lost 28 lbs, raised £488.57 and won a holiday voucher worth £250.

As a result of the campaign, over £57,500 was raised by the slim for heart research. All the prizes were donated by Cadbury's. Pictured here (left to right) are Roger O'Donnell, product manager of Marvel, Paul Bennett, Angharad Rees and Christopher Cazenove, the actor.

Arin Basak, formerly product manager of data communications products for Rediffon, has joined SE Labs (EMI) as product manager. He has previously been with ITT in the UK, Philips in Holland and MBE in Belgium.

Gordon Russell, who was appointed post doctoral fellow in the department of electrical engineering at Edinburgh University in 1977, has now joined Compeda as a microelectronics engineering consultant.

CW Soccer: tables and results

RESULTS									
Division 1					Division 3				
Atkins 4, Alfergo 3					3M 4, UCSL 1				
SIA 0, Gryphon 1					CJB 3, Sherwood 0				
Gryphon 5, Atkins 2									
Division 2					Division 5				
Comshare 4, Datasolve WE 3					Kington 1, British Aerospace 3				
TABLES									
Division 1					Division 3				
Gryphon	P	W	D	L	F	A	Pts		
SIA	5	4	1	0	17	4	9		
Atkins	3	3	1	1	12	9	7		
Alfergo	4	2	0	2	15	13	4		
Jadpu A	3	0	1	2	4	7	1		
Datasolve	2	0	1	1	4	7	1		
	3	0	0	3	5	17	0		
Division 2					Division 4				
Comshare	4	3	1	0	15	10	7		
Alfergo	3	1	1	1	11	10	3		
Datasolve City	1	1	0	0	8	2	2		
Datasolve WE	2	0	1	1	6	7	1		
John Laws	2	0	1	1	5	7	1		
SBS	2	0	0	2	4	13	0		
Division 3					Division 5				
Computer Wkly	4	4	0	0	14	7	8		
CJB	5	3	0	2	12	10	6		
Division 4					Division 5				
Wellford	4	3	0	1	27	11	8		
Forest	3	2	0	1	17	4	4		
CDC	4	2	0	2	18	9	4		
Jadpu B	4	1	1	2	6	21	3		
Allen	4	1	1	2	9	27	3		
Hockings	3	1	0	2	8	13	2		
Division 5					Division 6				
Gill & Duffus	4	3	1	0	12	5	7		
British Aerospace	4	3	1	0	11	4	7		
Kington	4	2	1	1	9	9	5		
NCR	4	1	1	2	10	11	3		
Barrow	3	0	0	3	2	8	0		
Ventek	3	0	0	3	2	9	0		

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Schools need new science subject

IVOR CATT'S letter concerning the misconceptions about the nature of digital semiconductor devices and systems among, not just the public, but the computer industry, hits the nail right on the head.

As one involved in teaching computing and electronics in schools, I am very aware of the division between hardware and software approaches, and I am deeply disturbed by the lack of suitable syllabuses which com-

bine these aspects (the AEB A Level "Electronic Systems" possibly excepted — and this does not cover the main age group of 11-16 years).

What I feel is required is a new science subject in schools, being a synthesis of solid state electronics at a "systems" level and computing. This should be taught from 11 to 18 and be additional to existing science subjects.

There is too much in modern

electronics for it to be taught as part of physics (integrated circuits are not even mentioned in most A Level physics syllabuses) and there is too much in computing for it to be taught as part of mathematics.

Over recent years various "soft option" arts subjects have appeared in schools. Why should we not now state our case when we have a discipline which has an extreme of intellectual rigour, good career prospects and the opportunity for great creativity on the part of the pupil. What other discipline offers these in one package?

Who will teach it? How can existing teachers be retrained, and how can heads, who are often not even scientists let alone technologists, be persuaded to finance and make room for the subject? These are all \$64,000 questions but answers to them must be found, and soon.

PAUL STEVENSON
Physics Department,
Norwich High School for Girls,
Norwich.

Must software industry go on re-inventing wheel?

THE report on the latest release of NCC Filetab package (Software File, June 21), quotes Tom Burnard as the original author.

This caused me to reminisce and I remember that the idea for a parameter-driven reporting package was the brainchild of the Dickinson Robinson Group computer systems team in Bristol, who then contacted NCC to see if their resources could be utilised for development. It was when Tom and the NCC became interested and, to their credit, produced the Filetab package.

In retrospect, I think the Dickinson Robinson team in the mid-Sixties ably led by Bob Johnson and Ron Young, were a pretty remarkable group.

Not hidebound by any preconceived ideas, a number of techniques and systems were produced and put into effect which even now, it seems from your pages, are still being rediscovered by others as the latest original up-to-date software.

One recalls a parameter-driven general data vetting suite of programs, automatic online file protection and labelling, the use of common I/O modules in all programs, a common basic structure for all programs, auto buffering, and, later on, the theory of beads and interactive

program modules, the integrated database and the idea that some good data could be gleaned even from bad input.

No doubt other teams were developing the same ideas at the same time, but it seems that even today there is still no easy way whereby useful ideas and techniques can be pooled and shared.

Recently I have been looking at application software being offered with the latest small computer systems, and really a lot of it is still very crude and vulnerable to user errors.

Very often it seems that the designers of today's small computer systems have abandoned the principles of program and system design that were established and proven for the big mainframe years ago.

Last week I looked at a brand new small computer system that allowed the user, merely by pressing the wrong button, to update his database with the same data two or three times, when of course it should only have been possible to update once.

Does the software industry have to go on for ever re-inventing the wheel?

J. E. C. CARTWRIGHT
Penzance,
Cornwall.

Teacher seeks advice on schools equipment

I AM a teacher in a South Wales comprehensive school and responsible for computer studies/science to CSE, 'O' Level and 'A' Level. I would be most grateful for the use of your columns to communicate with other teachers and lecturers in computing to seek their advice and assistance.

I have the use of a teletype, capable of being linked to an ICL 1904 and to a Digital Equipment PDP/11-34, as well as a postal service. I wish to extend the computing facility by perhaps acquiring a microprocessor or small mini, either new or secondhand. I wish to obtain information about the

use of the above equipment in schools and recommended sources of this equipment. I believe there are groups of teachers/lecturers able to advise on the use of micro, small minis and secondhand equipment. I would be most grateful to anyone who could supply me with the information I need.

I would also be most grateful to anyone who can supply me with reasons for using a school-based computer as opposed to using a terminal.

M. G. PAUL HUTCHINSON
Whitford,
Pontypool,
Mid-Glam CF37 6P.

Braille terminal sought

DOES anyone know of any second-hand, interactive Braille terminal which might be available for loan, lease or sale as from September 1979? We need such a terminal for a computer science student for a period of two years to enable him to have computing facilities comparable with those of his sighted fellows.

University of Essex,
Department of Computer Science,
Wivenhoe Park,
Colchester,
CO4 3SQ.

L. R. MacCALLUM
Senior Lecturer

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

NCC wants your views on databases

IN collaboration with similar organisations in Germany, Italy and France, the National Computing Centre is undertaking a major study into database usage.

The work, partly sponsored by EEC, covers a very comprehensive range of topics, and it is anticipated that the published findings will be helpful to computer users and in particular to those organisations thinking of adopting the database approach. NCC is about to start work in the areas of database adminis-

tration and data dictionary systems. May I ask any of your readers who have experience of these topics and who would be prepared to make their experience available for the study, to contact me. It would be especially useful to hear from those with strongly held views — positive or negative.

D. P. NICHOLLS
Senior Consultant,
DP Methods Division,
NCC,
Oxford Road,
Manchester, M1 7ED.

Union fears for future of ICL

From front page
Investments. It sold its 8% stake in Amdahl at a good profit, and any ICL shares bought and subsequently sold over the past three or four years would have shown a substantial gain.

The possibility of a Nixdorf bid for ICL is at present extremely remote, because Nixdorf is only about half the size of ICL. In the early 1970s there were discussions about Nixdorf getting together with ICL but there has been none recently. Nixdorf itself was involved in a major financial deal with Deutsche Bank late last year to secure its future and raise capital for faster expansion.

TASS believes that the computer, electronic and telecommunications industries are now so capital-intensive and bound up with government purchasing policies around the world, that only by long-term national planning with direct government involvement can the UK remain a force in the market, and regards the NEB stake in ICL as vital to this.

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MICRO NEWS

Briefcase system's 'world first' claim

WHAT has been described as the first computer in a briefcase was introduced last week by Data Logic, which has worked with Allied Breweries to produce the system.

Known as the Microframe (intended as the antithesis of mainframe) the new system has been developed with the long-term aim of being a portable general-purpose computer system.

The "world's first" claim may strike a strange note with French computer manufacturer R2E. At Sibob in 1977 it introduced the Micral V (for Valise) computer system (CW, September 29, 1977). The specifications for the two systems are not dissimilar.

The Data Logic system is based on an Intel 8080 processor equipped with 16K bytes of

memory. This is expandable up to 32K bytes. The Micral V is 280-based, and comes with 32K bytes of main memory as standard. Microframe has an 80K-byte Shugart mini-floppy disc drive, while the Micral V has 150K bytes of dual density mini floppy storage.

The Microframe has a 20-column thermal printer, while the Micral V is equipped with a 32-column unit; the Microframe has, in the Allied Breweries application, a 20-key numeric keypad, and the Micral V has a full qwerty keyboard fitted.

For display purposes, the Microframe has a small, four-inch, video monitor, while the Micral V uses a 12-line by 40-character plasma display.

Software for the Microframe has been written in Intel's PL/M, and Data Logic says that any

software written in either Assembler or PL/M will run on the system. On the Micral V Fortran IV, Business Basic, and Micro Focus, CIS Cobol are available.

According to Allied Breweries, the main reason it decided to seek Data Logic's assistance in developing Microframe, rather than using the Micral V, were that the latter is heavier — 14Kg compared to 10Kg, more expensive — £5,000 compared to £3,000 approximately, and perhaps most important of all, it is unsupported in the UK.

In the specific Allied Breweries application Microframe has been originally developed for, it will be used by pub stocktakers to provide landlords and managers with an immediate reckoning of the financial performance of the public house.

The system, which is still in the pre-production stage at Data Logic, will initially go out on trial in one area of Allied's territory, probably in the north-east of England. Once the trials have been successfully completed, the company's six beer divisions operating managed pubs will be offered the opportunity to purchase production models.

Data Logic is hopeful, however, of selling many more of the Microframe systems than the number Allied Breweries will purchase, which is estimated at around 150 units.

It is already working on extending the system to incorporate a qwerty keyboard, a V24 interface, an IBM 2780 interface for direct connection to a mainframe computer, dual mini floppy disc drives, 8-inch disc drives and a normal-sized video display.

A version for the general market is expected to be available by the end of this year, according to Data Logic, and the company is also hoping to sell the system in the US through its parent company, Raytheon.

Out on his own from Nascom

FORMER software director of Nascom Microcomputers Tony Rundle has left the company to form his own software company, Starbase.

His move will not deprive Nascom of his services, however. Most recently he was involved in extending the Microsoft Basic Interpreter for the company.

He will still be involved with the company, in fact his first products will be a range of cassette-based programs for the Nascom 1 and 2 systems. But he will have greater freedom to produce personal computer software, and he has plans for products for both the Commodore Pet and the Ohio Scientific Superboard.



Tony Rundle

\$180 billion world market—report

THE world market for microelectronics-based products is now about \$180 billion, and growing at 12% per year, according to a new report published by the Economist Intelligence Unit.

The report, Chips in the 1980s, sets out to cover, in layman's language, the application of microelectronics technology to consumer and business markets.

It makes the point that, of this \$180 billion market, only some

\$6 billion goes to the manufacturers of the chips themselves.

"Application program development," the report states, "forms the largest cost in chip-based technology," and it suggests that this is a prime reason why many of the semiconductor companies are becoming more systems-oriented.

As an exercise for the layman, the report traces a typical (if hypothetical) new application of microelectronics through from the original idea to manufacture

the specification of the system includes the use of three microprocessors, two Zilog Z80s and one Intel 8748. Main memory is a minimum of 32K bytes, expandable up to 64K bytes, while secondary storage is provided by up to three Shugart SA 400 mini-floppy disc drives. A 10-Mbyte hard disc option is also available.

The system is completed by a video display, a keyboard and three keypads providing a total of 132 keys, and a daisy wheel printer. The whole package comes in desk-top housing measuring 24 by 48 inches.

Software for the Leprechaun is available in Fortran, Cobol and Basic, and applications programs to handle standard small business problems such as inventory control and general ledger are available. According to the company, one of its first

Cromemco UK dealer

ANOTHER company has been appointed by Californian microcomputer manufacturer, Cromemco, as UK dealer for its range of hardware.

The company is Datron, based in Sheffield, and a new Microcentre division is being

established by it to handle business.

Among the Cromemco Datron will be selling are both the System 3, and the 22-H hard disc computer. The 22-H hard disc computer has dual floppy discs and 4Mbyte hard disc in a system. 64K bytes of main memory price is expected to be £1,000.

Datron are also dealers for ITT 2020, and can offer support for ITT, Cromemco, and Pet computer systems.

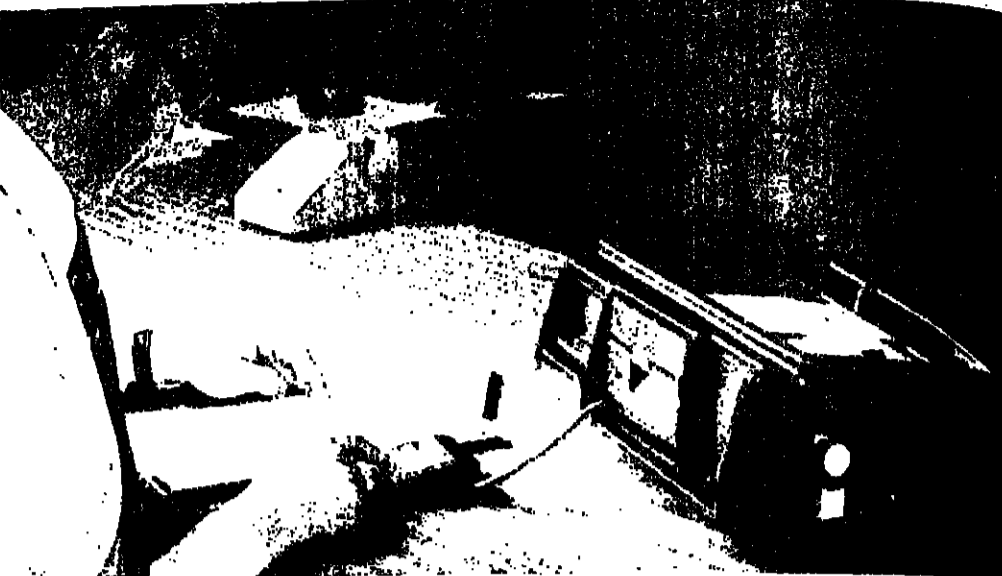
likely applications will be word processing.

The system comes with editor/composer software. It has been organised specifically for word processing tasks. Its functions include search, global editing, document assembly, automatic hyphenation, automatic page numbering, automatic page numbering, and automatic page numbering.

It has been designed to be immediately useful to a typist and the training time needed to make an operator productive is said to be less than a day.

This has been achieved by greatly expanding the number of control keys available to the operator, so that the most commonly used commands can be entered by simple keystroke rather than with multiple keystrokes.

by Martin Banks



The "world's first" computer in a briefcase, introduced last week by Data Logic, is pictured above. On the right is the Micral V, a remarkably similar system from R2E in France (accompanied by R2E president Thi Truong). The Micral V was introduced in September 1977.



Transatlantic leprechaun will soon be available in Europe

A CANADIAN leprechaun — if that is not a contradiction in terms — is about to be launched into Europe. Leprechaun is the name given to a new desk-top microcomputer system by its manufacturer, Patrick Computer Systems of Winnipeg.

The company is currently in the throes of establishing European distributors for the system, which has an FOB price of £8,097.56 in its most common,

8K memory configuration.

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Philips and Siemens personal market bids

●From front page

with no knowledge of computers to write a program of up to 80 steps to manipulate alphanumeric characters and symbols of men, battleships and racing cars on screen.

Recognising the limitations of the system, the instruction booklet suggests that those who develop an interest will want to go on to more advanced languages and systems.

The G7000 has a basic unit with a 49-key alphanumeric keyboard, a pair of joystick controls and colour TV interface. However, it relies for its operation on a plug-in ROM module called a Videopac. One is supplied with the basic unit containing three games. Several other games modules are available at about £10 each, and Videopac 8, the computer programming module, enables short programs to be written in a simplified form of machine code.

Currently available Videopacs take the form of ROM cartridges mounted on circuit boards with edge connectors. The socket into which they plug could be the route for future expansion. A cassette storage interface is planned for later this year, and the RAM may be extended from its present 128 bytes, either by substituting a higher capacity single chip device or through the cartridge socket.

The basic unit uses the Intel 8048 processor chip, but the Programmer Videopac implements its own set of 29 one or two byte "machine codes" which can be entered either as hexadecimal numbers, or as mnemonics.

All input is from the keyboard and all output goes to the screen. The 64 character set has upper case letters only, plus numbers and graphics symbols. They use a large seven by seven matrix and only 256 characters fill the screen.

The Siemens PC100 was announced at the Hannover Fair and is now sold in West Germany. Expected in the UK later this month, it will sell in open chassis form for about £600 with a 20 character LED display and a 20 column thermal printer.

£50m UK market for retail laser scanning forecast by 1984

THE market for retail laser scanning equipment, to read bar-coded product labels in supermarkets, will stand at about £50 million and financially account for 50% of the total installed base of electronic checkouts in the UK by 1984.

One of the conclusions of a report published this week, it highlights the changes to come for both manufacturer and shopper as product coding systems — either the Universal Product Code or the European Article Number — are implemented.

The report, Electronics in Supermarkets, says that the £100 million total installed base will be made up of 8,000 laser and 25,000 non-laser checkouts, and that the major growth driving factor, ignoring unforseen union or customer resistance, will be the rate at which products are coded and the volume of items so marked.

Economic operation of laser equipped checkouts requires at least 80% of items to be marked, suggests the report, but it does give a compromise solution.

Nanodata builds on microcode lead

ALTHOUGH only a recent arrival on the IBM plug-compatible mainframe market, Nanodata Corp of Buffalo, New York, has been selling a universal emulator, the QM-1, for about four years. The QM-1 predates the bit-slice microprocessor, which makes the building of emulators comparatively straightforward, and as a result, Nanodata has well developed skills in microcoding.

The QM-1 is built in traditional TTL technology, and comes without a native instruction set. It can instead be microcoded to emulate almost any other computer, and also allows emulation of several dissimilar

Mammoth task faces IBM

SIXTY-TWO thousand man-years of effort will be required to comply with the demand, says IBM, but the company has nevertheless been ordered to produce further documents in the mammoth US Justice Department suit against it.

The documents, originally demanded in February, relate to chairman Frank Cary's testimony. IBM declared the demand unreasonable and oppressive, but its appeal has been overruled by Judge Edelstein. It is possible that withdrawal of Cary as a witness would remove the need to produce the documents.

New machines for Swansea

STUDIES are now being carried out on the specifications for replacements of the mainframes at the Driving and Vehicle Licensing Centre, Swansea. The change is at present scheduled for 1983, Transport Minister Norman Fowler told the Commons.

Replying to the former Transport Minister William Rogers, Fowler said it would be premature to speculate on the likely cost of the project. At present, the centre has one ICL System 4/70 and two 4/72s.

machines to run on the same QM-1 processor in parallel.

Universal emulators are widely used by the US forces and the aerospace industry. Applications include software development and debugging, since the machine was intrinsically designed to facilitate this; hardware design; substitution for a system component not yet available; evaluation of a variety of machines running the same software before the machines are available; and checking the trade-offs between software and hardware modifications.

Machines already emulated on the QM-1 include the Intel 8080, CDC-160A, Data General Nova, Univac 1106, IBM 360 and 370, IBM 7094, DEC PDP-11 and Motorola 6800. Emulation of a wide variety of specialised military computers like the Univac AN/UyK-20 have also been done.

It has an internal 80 nanosecond cycle, and the user programmable control memory consists of 1K 360-bit words

horizontally and 40K 18-bit words vertically. The vertical microcode is similar to machine language coding, and the horizontal is the control unit actually driving the hardware.

Although most QM-1s have been sold for software development applications, a few are in use as back-up to old machines like the IBM 7094. However Nanodata's main thrust into the commercial market is with its VMX IBM 370 emulation.

The VMX, like the Magnuson M80, is more than a simple 370 emulator. It has been designed to allow up to four different emulations to run concurrently on the same machine, and is available in multiprocessor configurations. The single processor VMX is claimed to offer power in excess of the 370/148 "at minicomputer prices."

A wide variety of bit-slice and other microprocessors are used in the VMX, in both TTL and ECL technology. First deliveries are set for the last quarter of this year.

Hopes of swift end to Univac 9-week strike

THE strike at Univac's Twin Cities plant in Minnesota, which builds the 1100 line for the worldwide market, entered its ninth week on Monday, but talks with the striking engineers were under way and both sides are hopeful of a swift solution.

Meanwhile Univac has issued a strong denial that any new models are planned in the 90-series at present, and specifically stated that there is no truth in French reports that new 90-series models will be announced at Sibob in September (CW, June 28).

Speculation that there would be new 90-series models has been fuelled by IBM's announcement of the System 38 and the 4300 machines which compete in the same market.

However, the latest models in the 90-series, the 90/40 for OS/3 users and the top-end 90/80-4 for VS/8 users, each of which offers enhanced performance by the addition of cache memory, were announced only a year ago, in May 1978.

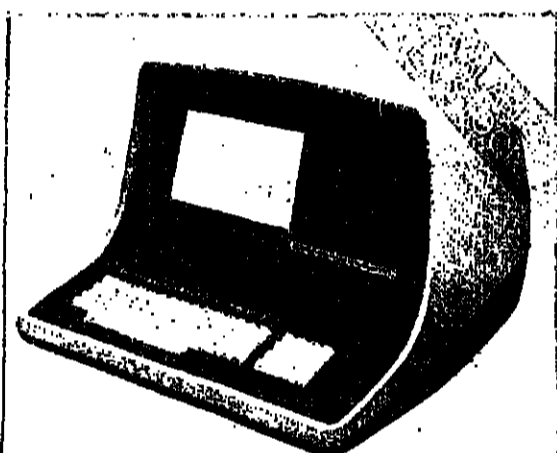
Univac reports that despite the IBM announcements, the 90-series in its present form is doing conspicuously well, and that March 1978 was the best month yet for 90-series sales.

Univac office machines go into US

MARKETING of the Nippon Electric Astra small business computer (CW, June 28), begins in the US this month. The Japanese company is going through distributors rather than selling direct, and is concluding negotiations with 10 dealers in four regions. It hopes to sell between 200 and 300 of the Japanese-built machines in the first year, and has placed the 16-bit microcomputers in the \$20,000 to \$150,000 price bracket.

Training centre

THE NRDC's high technology software subsidiary Compeda has opened a training centre in Sileon Valley, California, to provide courses in the Gaelic package for the design and manufacture of integrated circuits.



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INTRODUCTION TO PASCAL

The simplest, yet most powerful aid to bug-free programming

Part 2

Record, symbolic values and subranges

THE designer of Pascal, Niklaus Wirth, has written many books on programming, one of the most popular going by the refreshing title of "Algorithms + Data Structures = Programs". Most programmers would agree that if we can get the data defined nicely and devise a suitable algorithm, then we've got a program. But will it work? Shakespeare put the problem well in Henry IV, Part I:

GLENDOWER: I can call spirits from the vasty deep.
HOTSPUR: Why so can I, or so can any man;
But will they come when you do call for them?

Conscious of the incalculable and often fruitless hours, both of man and machine, spent in debugging, Wirth built into Pascal safeguards against common programming errors. Instead of assuming that "the programmer knows best", even if he is trying to add number-of-children to days-off-sick and put the answer in next-of-kin, the language insists that you say what you mean and that you are consistent. To use a language designers' term, Pascal is strongly typed; you must give everything a type and cannot normally mix objects of different types.

Record time

This week we shall look at some of these self-protecting types in the context of our example of a Flexitime system. The most common objects we will be dealing with will be times, clock-on time, clock-off time, "core" time, and so on. So we define a type which says exactly what a "time" looks like as follows:

```
TYPE time = RECORD
  day: (mon, tues, wed, thurs, fri, sat, sun);
  hour: 0..23;
  min: 0..59;
END;
```

The first advance towards bug-free data is that the components of a time are known by name, ie day, hour and min. Languages without a record facility, like Fortran and Basic, have to rely on comments or appended "convention tables" to remind all who come into contact with the program that T(1) holds the day, T(2) the hour, and T(3) the minutes. How often are these comments out-of-date or even non-existent?

Those who know Cobol, PL/I or Algol 68 will be familiar with records (or structures) but might be puzzled by the lack of level number. Pascal does without level numbers and achieves the same effect by "nesting" the record definitions. Deviating from Flexitime for a moment, let us illustrate this point by incorporating time in another type.

Records in records

Here is a type that might be used for baby-tags in a maternity ward.

```
TYPE baby = RECORD
  sex: (male, female);
  doctor, mother: name;
  birth: time;
END;
```

(A) Unpacked

Day	Full-word
Hour	Full-word
Min	Full-word

(B) Fully packed

3	5	6	(bits)
[Diagram showing bit fields for day, hour, and min]			

d	h	m
a	o	i
y	u	n

(C) Packed on byte boundaries

3	5	5	3	6	2	(bytes)
[Diagram showing byte fields for day, hour, and min]						

d	h	m
a	o	i
y	u	n

Figure 1. Actual storage structures for time

Assuming that name is some character array type (defined elsewhere), a baby tag could be depicted diagrammatically as:

SEX	female
DOCTOR	Dr Cohen
MOTHER	Mrs J. Wright
BIRTH DAY	Wed
HOUR	4
MIN	33

The whole birth field can be moved around as an entity, or parts of it can be extracted by means of the usual "dot" notation. For example, if we declare:

```
VAR thisbaby: baby;
```

(ie that thisbaby is to be a variable of type baby) then valid fields of this variable are:

```
thisbaby.sex
thisbaby.birth.day
thisbaby.birth
```

but not

```
thisbaby.day
```

Pascal insists you say what you mean and that each step in the record nesting is mentioned. Even if it is thought that there would be no ambiguity if some of the levels were left out, Pascal prefers the safe course. However, you can factor out as many levels as you wish with a WITH statement. Say we specifically wanted to talk about the baby's birth time. We write:

By Dr
Judy
Bishop



In the second of our 10-part series, Introduction to Pascal, Dr Judy Bishop looks at aids to bug-free programming. Dr Bishop, a lecturer in computer science at Witwatersrand University, South Africa, first became acquainted with Pascal when she was studying for her PhD at Southampton University. Previously a user of Algol 60, Fortran and various assembly languages, she has since adopted Pascal for everything she programs.

WITH thisbaby birth DO BEGIN
and all the statements up to a corresponding
END
can refer to the field's day, hour and min by themselves.

Days as names, not numbers

To get back to the time record, let us consider the bit definitions in more detail. The first is a list of words. These are symbolic values which day can take on and are known as enumerated scalar type. Despite the long title, symbolic values are a very simple concept and a great aid to automatic documentation. For example, let us declare:

```
VAR clockon: time;
```

(that is, clockon is a variable of type time ready for more reading far less error-prone to write)

```
IF clockon.day = sun THEN display
```

than

```
IF clockon.day = 7 THEN ...
```

After all, there is no general agreement that Sunday be seventh day; many people consider it the first, or it may be zero-th or sixth (if you like counting from zero). These symbolic values, then, leave the numbering to the machine and let the programmer say what he means instead of once again having consult tables of conventions.

There are 24 hours in a day

Since this is a fact, we can make use of it to protect fields which hold hours by defining the appropriate subrange of numbers:

```
hour: 0..23
```

The effect of this statement of fact is fourfold:

1. Documentation is automatically enhanced.
2. Protection. Any attempt to assign anything outside 0..23 will be trapped and signalled as an error. The reward is that most of these errors are actually detected by the compiler at compile time. Thus we have:
3. Speed. There is very little penalty attached to running a program "with checks on". In fact it has been shown that array bounds and array indices are declared over the subranges, as is normally the case, then programs run up to 10 times faster than those which do not use subranges. The reason is that the compiler can make deductions and verify that subscripts will not go out of range and therefore it does not need to generate the checks.
4. Space. If we want to save space when storing times, we can declare the record as PACKED:

```
TYPE time = PACKED RECORD
  day: (mon, tues, wed, thurs, fri, sat, sun);
  hour: 0..23;
  min: 0..59;
END;
```

It is now up to the compiler to calculate how much space the field needs and to squash them up as it sees fit. It may do pack the fields tightly as in Figure 1b, or to start each of boundary for faster access as in (c).

The point is that the programmer is not forced to work out exact number of bits or bytes a field needs; he just specifies values that must go there and the compiler does the real work, too, that the numbers are stored in binary, for most efficient computation.

Summary

Pascal provides data structuring facilities that enhance documentation, security, speed, and space. Some of these records, symbolic values, and subranges. To my mind, the subrange facility that is the simplest yet most powerful and error-free programming yet devised.

Part 3. Back to Grammar. We go back to basics to see how Pascal is simply and economically described.

Pascal User's Group

THE best way of keeping track of Pascal implementations, applications, and other developments, is by joining the Pascal User's Group, which is headquartered at the University of Minnesota, Minneapolis. PUG is a worldwide group run by volunteers, and its main activity is the publication of Pascal News, which usually appears four times a year. PUG has a European node based at the University of Southampton, and not only in the UK, but also in North America, Western Europe, and Central America. Anyone in these areas who wishes to join the group, or receive the newsletter, should send a subscription form to: Pascal User's Group, c/o Computer Group, c/o National Institute of Research in Computer Science, University of Southampton, Southampton, SO9 5NH.

PERIPHERALS AND TERMINALS

Micros blur the boundaries

By Roger
Brady

THE incorporation of microprocessors into every aspect of computers has complicated the definition of peripherals and terminals from what was previously a very simple description, relating to the basic functions of input, output, storage, and transmission, to a complex network of distributed systems.

Modern peripherals and terminals may be small systems when offline from a controlling processor and yet merely perform peripheral functions when connected to it. Peripherals and terminals should thus be viewed according to the functions they perform.

Although for many years peripherals were specifically designed and capable of one function only, modern peripherals tend to be a more specialist application of a general system. The era of distributed processing began a lot more quickly than would have been expected five years ago.

The main peripheral functions are input, output and secondary storage, which when linked with the transmission function turn peripherals into terminals. The input functions can be considered in terms of punched devices (punched cards, paper tape), character recognition (OCR, OMR, MICR, etc.) and keying (keyboards).

Output functions can be considered in terms of displaying and plotting both set characters and constructed figures (character and graphic displays, printers and graph plotters). Secondary storage is generally either serial access (magnetic tape), or random access (magnetic disc). Terminals in general usually have both input and output features, and often secondary storage as well.

While there is no doubt that cards and paper tape have been almost totally superseded by other methods for handling bulk input of data, both have advantages for input of small discrete quantities of data such as job control cards or students' programs.

OCR was originally hailed as the answer to bulk data preparation and input problems, by reading source documents directly. The cost of the complicated scanning and recognition electronics coupled with the increased use of distributed data entry terminals placed a severe restriction on the growth of this method.

The use of the LSI technique has enabled large fast character recognition systems to cater for both a wide range of fonts in the one document with a wide acceptable contrast range (due to the use of LSI photo-diode arrays), and allowed low cost systems (under £1,500) to be developed for use in such areas as word processing.

MICR tends to be restricted to banks, while OMR tends to be restricted to specialist publications such as market surveys, etc. Probably one of the most important developments has been the increasing use of barcodes and magnetically-encoded plastic cards for retail applications.

There are, of course, other input methods, such as pressure pad character recognition systems, which recognise the directions of different strokes drawn on the paper, and voice recognition systems, that have been in existence in a limited form for some years.

The king of the low and medium cost hard-copy output devices is undoubtedly the dot-matrix printer. However, it owes its success to the development of LSI electronics. The majority of these printers are microprocessor controlled, even the very low cost units costing a few hundred pounds.

This use of microprocessors can best be illustrated by the example of bi-directional printers where cheap miniaturised buffer storage and computerised control enable maximum effective printing to be obtained from a basically slow-speed serial printing device. Plug-in ROMs enable character sets to be changed easily. Modern electronics enables the number of moving parts to be kept to a minimum, increasing reliability and reducing cost.

The comb-printer is probably the most important development in the medium speed range, where the dot-matrix principle is used in a slightly different manner. The metal comb has one tooth for every character position across the paper, with a hammer for every tooth. The line of print is formed by horizontal oscillation of the comb, the hammers impinging on the teeth as appropriate, combined with the vertical movement of the paper by a stepping motor.

The other important development of recent years is the daisy-wheel printer which has made word processing systems a reality. Its ability to produce formed-character printing of high quality in a variety of easily interchangeable type styles, with a method that is suited to electronic control, has ensured its success.

Non-impact printing methods have been developed for both extremes of the market. Thermal printers, which form characters usually in a dot-matrix by a heating process on special paper, and etching type printers, which electrically erode the surface of a coated paper, are common at the lower end of the market, while electrostatic and laser printing systems have been developed at the very high speed (20,000 lpm) end of the printing spectrum. Ink-jet printing methods have advanced considerably over the past few years, tending towards methods of spraying minute droplets rather than a continuous stream of ink.

Computer output to microfilm continues to develop, if slower in development than other forms of output. The falling cost of electronics has enabled more versatile systems to be developed.

Modern plotting systems, both pen and electrostatic, usually incorporate a variety of software routines in ROM, reducing the need for tedious user programming and control microelectronics to simplify mechanical movements.

Display systems, both character and graphical, have also felt the impact of microelectronics, and the dot-matrix principle has again been applied, with considerable effect to the generation of characters and graphic symbols. The incorporation of large amounts of semiconductor storage has enabled local refreshing to be used, reducing the overheads on the controlling processor.

Developments in secondary storage, like many other peripheral developments can be summarised as providing more in the same space. Magnetic tape has developed to provide packing densities of 6,250 bpi at the top end of the market, while audio cassettes are commonly used to provide storage of 50K characters per cassette in the small microcomputer market.

One modern development, which shows considerable promise as a compromise between the ruggedness of floppy discs

and the fast access of cartridge discs, is the Winchester type unit which includes the moving head mechanism in the same environmentally sealed housing as the disc. This system allows the head assembly to be very much lighter than the retractable mechanism needed for a cartridge disc.

Microelectronics has again made a very significant contribution to disc storage in that controllers are very much smaller and have increased facilities. Floppy disc controllers are, in fact, available as single chips.

Mass storage systems developed for the large system user

include the Ampex type system using video-width tape in a continuous reel and the IBM 3850 type system, which uses discrete lengths of wide tape mounted on automatically loadable cartridges.

Terminal systems have shown a definite trend over the past few years towards a universal terminal with a slight variation according to application, instead of the range of terminal types that were available in the past. It is, for example, possible to obtain display terminals with a printer incorporated in the same

● Turn to page 20

Peripherals and terminals account for an increasing proportion of the total cost of computer systems as they become more versatile and sophisticated and the prices of processor and memory components continue to fall.

It is not surprising that the computers sector working party of the National Economic Development Organisation is increasingly concerned about the level of peripheral imports, which last year exceeded £250 million.

High capacity disc drives, for example, are not at present made in the UK, and, although most other types of peripheral are built here the volume of imports exceeds national production in most cases.

The use of microelectronics is enhancing the capabilities of peripherals and terminals and blurring the boundary between the peripheral and the host.

This special section on Peripherals and Terminals looks at some aspects of the market. Here a senior consultant at the National Computing Centre, Roger Brady, examines trends and developments.

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Revolution on the disc drive scene

By David Shear

AFTER a quarter of a century of magnetic disc drives (the first IBM patents date from 1954), the OEM disc drive industry has now entered an era of major change. In a few years some aspects of the scene will be unrecognisable. In this article I have attempted to examine the changes in the drive supply industry, and new products.

From the early '70s until a year ago, the disc drive scene was relatively stable, with little change in suppliers, products or technology. This period can generally be regarded as an era where market considerations prompted the emergence of product developments.

The one major growth area was the floppy disc, which, starting in the mid-'70s, will reach a shipment level of over one million units during this year. The OEM market throughout this period was for floppy discs, 2315/5440 type cartridge discs, 2314 type disc pack drives and the newer 3330 type disc pack drives.

For readers not entirely familiar with IBM type numbers, used here as technology indicators, a short glossary is given in Table 1.

The pressure from the market

pushed drive capacity gradually upwards, so that 1.5 Mbyte drives were pushed to 3 Mbyte, then to 6 Mbyte and in some cases to 12 Mbyte; while prices remained relatively constant per drive. However, this was accomplished by pushing the established technologies further, rather than by revolutionary advances.

The two keys to the revolution that has just begun are the dramatic reduction in cost in computing power, and the establishment by IBM of the fixed media Winchester type technology. The advent of microprocessors in small, cheap busi-

ness systems has promoted the opening up of huge new market areas for computers.

This market led first to the explosive growth in the supply of floppy discs, but the requirement for more storage to match the increased power of microprocessors, still at very low cost, is now leading to the emergence of a new class of fixed disc drives. These new low cost fixed discs, only made possible by Winchester technology, will help to satisfy this market.

Five manufacturers have announced fixed disc changes over the last year. At this year's NCC in New York about 15 new pro-

ducts of this sort were shown, most of them with the new 5 inch media. Already, fixed discs, little bigger than floppy drives, are capable of storing up to 20 Mbytes.

Obviously, as small scale computers experience this jump in price/performance, the storage requirements of larger computers must increase to protect their competitive position. This is happening in two ways.

New cartridge drives using 3330 technology and other advancements to improve bit and track density are appearing, but more revolutionary are the very high capacity fixed disc Winchester drives, which have started to proliferate over the past year.

One major problem that can occur, when such a large number of new drive types appear, is that of usability. Disc drives need controllers and a new drive with a non-standard interface cannot quickly be incorporated into a system. Drive designers are attempting to solve this problem by building more of the controller logic into the drive, thus simplifying the interfacing job, or by emulating an existing interface.

There is also pressure to remove some of the problems of disc control from the systems builder. By putting a microprocessor into a drive, not only can the drive electronics be simplified, but spare processing power can be used to format data, handle errors, perform

Magnetic peripherals are unlikely to be replaced by semiconductor storage for many years because the dramatic fall in the cost per bit of solid state memory is almost matched by dramatic improvements in the recording densities of disc drives.

In this article David Shear, product marketing manager with Data Recording Equipment, discusses some of the latest developments in disc technology.

by in-house manufacture. Large companies intending to be a major force in computing are busily acquiring in-house manufacturing capabilities, buying up marginally profitable peripheral manufacturers. Xerox is a prime example having bought disc manufacturers Shugart, Diablo and G comp.

Some single product line suppliers may survive in the term by super efficiency and single-minded concentration in a limited market. Others may survive by changing themselves into systems suppliers or by being absorbed into larger groups. Independents of yesterday are going fast and new companies

Type	Disc type	Approximate capabilities	
		tpi	bpi
2314	Multi-platter pack	100	2200
2315	Front-loading cartridge	100	1100/2200
5440	Top-loading cartridge	100/200	1100/2200
3330	Multi-platter pack	200/400	4000/7000
Winchester	Fixed media	300/600	5000/11000

Table 1: A technical identification glossary.

diagnostic routines and other similar controller chores.

It is also possible to do some simple file handling so that the device becomes, in effect, a "storage computer."

As the power and speed of the microprocessor increase so do the possibilities for this storage computer, such as sophisticated data handling (searches, file updates, etc), and multiple device type handling. The latter is useful with Winchester drive types in allowing a cheap data dump unit to be incorporated for back-up purposes.

The changes just described are suitable for drive manufacturers because they can result in greater added value, but what about the systems builder? His interests are best served by obtaining the lowest possible cost for the items not manufacturable in-house, generally the drive mechanics and specialised analogue electronics. These opposing requirements are producing changes in the structure of the computer industry, when coupled with the continual downward pressure on costs.

To retain profit margins when prices are dropping, lower costs are necessary. In the disc drive industry this can be done either by technological innovation, or

are arising with innovative products, thus accelerating the death of older technologies.

One exception to a general trend is CDC which, by a combination of size, innovation and judicious joint ventures, such as the recently announced link-up with Data Recording Equipment, will ensure the continuation of a strong, independent peripherals sector.

A further factor which will undoubtedly contribute to the emergence of Japanese products. It is naive to assume that given the home base, which they now have, the Japanese do not have the in-depth experience and capability to launch a successful attack on a US-dominated market.

The new products which have been talking about fall mainly into the fixed disc, Winchester area. The forerunners of these were the high (up to 80 Mbytes) capacity drives typified by the Memorex 601 and the MMD, which are now available from a large number of suppliers. Hot on their heels are the low cost, low capacity drives, such as the Shugart 500, offering between 10-20 Mbytes.

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The Raytheon PTS100 display terminal, sold in the UK by Data Logic, can emulate all terminals used with major mainframes.

Growing value of host-independence

By David Bonny

THE "host-independent terminal system" has played a vital role in the development of computer communications during the past few years... and its importance and value is likely to grow as we move more and more into the microprocessor age.

Despite the fact that mainframe manufacturers and most minicomputer suppliers include video terminals in their ranges of peripheral devices, the need for a terminal system that can interact with a variety of host processors is well established.

At first these terminals were developed by independent manufacturers who realised that if they designed a terminal system that would attach to a variety of mainframes, they would be able to produce in large quantities and thereby reduce prices below those of the mainframe companies. This commonality also simplified logistics and maintenance requirements.

In the early days the biggest beneficiaries were users who had "slightly special requirements", the in-built flexibility required to emulate mainframe suppliers' terminals being used to meet individual customer needs. The large airline networks are good examples.

As the market developed, further major reasons for host-independent terminal systems became apparent. For example, some users have discovered the attractions of keeping online VDU systems unaltered during the change-over period from one mainframe to another.

Equally, large organisations frequently have more than one type of mainframe, and many more have a mixture of mainframe and mini systems. In these circumstances the ability to use a common terminal provides major benefits in training, maintenance, flexibility and purchasing.

Operating staff, their unions and O&M department are all concerned about the choice of the best terminal. The possibility of using a standard operator interface for all systems can reduce the selection effect, and the associated negotiations, into one single exercise.

Equally, many applications are now relevant to different parts of an organisation and a single user may require access to different systems running on different host computers.

In a perfect world this requirement might be unnecessary, but in practice it is frequently impossible to avoid. For example the order processing system may run on a local mini, the sales history file inquiry on the mainframe, the sales forecasting on an in-house or bureau time sharing system, and the order acknowledgment could be produced on a word processing system.

How, then, are these benefits achieved? The basic connection between terminals and host processors is the well-defined international standard CCITT V24 modem interface.

In addition, there are four other areas that have to match the host: display format and character set; keyboard functions; terminal protocol (the interpretation of command data); and, communications protocol (the "hand-shaking").

These can all vary from host to host although the first requirement can largely be met by a 1,320 character display of 24 lines of 80 characters and a standard UK character set.

The special keyboard functions are invariably related to the host protocol, leaving the major part of the keyboard as standard. However, intelligent functions at the terminal increase the need for special keys.

Early video terminals had "hard-wired" logic and were therefore designed and built for a particular host. But the advent of the minicomputer made it viable to have a "soft-centred" controller. Specialised minis were used as powerful cluster controllers supporting a large number of displays and other peripherals.

The main functions such a system has to perform are provided by an appropriate software control system, supported by easily changed hardware variables such as modem adaptors and keyboards.

The flexibility is enormous. Straight emulation, intelligent processing systems and shared logic word processing systems can all become available by simply having the appropriate peripherals and keyboards and then loading the required control software.

The basic emulator frequently only requires a low cost cassette drive for program loading. Furthermore a maintenance engineer can then load a diagnostic program to aid problem determination.

Equally, relatively simple amendments to the control software can meet users' specialised needs, and a standard software product can turn an emulator system into a powerful intelligent terminal, with full data entry and validation capabilities, while retaining the standard terminal protocol link to the host.

Frequently the cluster controller will also offer a wider range of peripherals than the standard terminal systems. Typical of these are card readers, fast line printers and a wider choice of serial printers.

All hardware within the system is normally general purpose. Any that is particular to a given application, such as asynchronous or synchronous modem adaptors, or matrix (serial) or line (parallel) printer adaptors, will be fitted as required.

The terminal itself may be standard, but is likely to need tailoring to meet different screen formats. Keyboard differences, although slight, can be extremely important since this is the operator interface.

Therefore, although it is possible to produce a keyboard which has IBM 3270, ICL 7181, Univac V110/200, Honeywell 7700 or Burroughs TD 830 as subsets, the key layouts will not match.

This is not critical for new systems but identical layouts are desirable when expanding and replacing existing systems. This is achieved by the use of a number of layouts and a "programmable" keyboard which transmits internal codes which

are translated by a software table. This feature also enables tailoring to a user's individual requirements.

The continuing cost/performance improvements available through new technology is also being reflected in stand-alone terminals.

The original hard-wired versions were replaced first by microprogrammed logic and, more recently, by microprocessors. Control software is stored in PROMs (Programmable Read Only Memory) and can be changed to suit different needs.

It is also possible to load software into the terminal from the host — and if the terminals have local storage, it can also be loaded from there.

Thus we have the outline design for a new generation of terminal systems. Each terminal will have its own micro and be backed by a micro-based controller which will provide sharing of peripherals among the terminals.

So with modern terminals, it becomes possible to start with a system that performs in standard interactive mode to a

THE growth of complex networks has created a need for terminals which are able to communicate with more than one make of host mainframe. Here, David Bonny, senior consultant with the terminal systems division of Data Logic, looks at some of the features required of a host-independent terminal and how they can be realised.

given host and then expand its capabilities by adding peripherals and different operating software as and when required.

Undoubtedly, the next generation of microprocessor-based systems will be more powerful and more flexible. Multiple communications channels will enable clusters to interact with more than one host; concurrent intelligent functions, such as word processing, data entry and validation will become increasingly used.

The trend is clear: the increasingly powerful terminal will remain as the human/computer interface, becoming the "intelligent associate", a term first used at a recent address to Interface '79 given by J. Thomas Markeley, President of Raytheon Data Systems. It will open the door into a new world of information processing and communications world.

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PERIPHERALS AND TERMINALS

German printer cuts pages

INDIVIDUAL cut pages are delivered by the M78 Self Service printer shown here. Introduced to the UK market by Tally, the M78 is built in West Germany by Tally's sister company, Mannesmann-Praezisions-technik. One of its first applications is issuing tickets to Stuttgart tram passengers.

According to Tally other applications areas for the M78 include airlines, shops, hotels, and banks. At an airport or station, for example, a traveller can press a key for information and receive it instantly in printed form.

The M78 comes with one 80-character buffer and can print bi-directionally at 200cps. It can accept a wide range of standard 8-bit parallel interfaces.

Stationery that can be printed on and out by the M78 includes reel or fan folded paper with up to six parts and card as heavy as 250 grams per square centimetre. The paper transport can be tractor or friction.

The card or paper is cut inside the M78 by an optically triggered roller pressing it against a blade. The ticket or form then appears from a slot in front of the printer.



An exchangeable tape transport

A SOLUTION to the problem of non-exchangeability of media presented by the growing line-up of 8-inch fixed media disc drives appearing on the market is offered by the Kennedy Co. in the form of the Model 640 cartridge tape transport. The 640 can be used as backup storage for an 8-inch drive and provides a maximum unformatted capacity of 17.3 Megabytes.

The 640 uses 3M-type DC 300 cartridges and comes with 4-track read-after-write recording heads. Performance features include a recording density of 6,400 bpi, a recording speed of 30 inches per second and a rewind and search speed of 90 ips. Kennedy quotes a data transfer rate of 192 KHz and points out that the 640 utilises a modified frequency modulation recording mode.

To reduce time-consuming rewind operations the 640 uses what Kennedy describes as a

"serpentine" recording technique in which adjacent tracks are recorded in opposite directions.

Since physical compactness is one of the most important selling features of 8-inch disc drives, Kennedy has kept the size of the 640 down to similar dimensions: it measures 8.36x6.5x4.5 inches. Price is \$900 in OEM quantities.

A wide assortment of 8-inch fixed media drives was shown at this year's National Computing Conference in New York last month, including models from Pertec, BASF, Micropolis, International Memories and Kennedy itself.

Because the hard 8-inch discs they all employ are non-removable, the recording capacities and data transfer rates

achieved are far higher than on 8-inch floppy disc drives, while the amount of physical space occupied is no greater — size being a major consideration with small commercial and personal computing systems.

The one big drawback compared with floppy disc drives is that the media cannot be removed, so that some form of high-speed back-up storage is needed if the user files exceed the maximum capacity of the drive.

The Kennedy 7000 drive, for example, stores 12 Megabytes on two fixed 8-inch platters.

The drives from Pertec and International Memories both have capacities of 20 Megabytes, while the BASF 6170 offers capacities ranging from eight to 24 Megabytes.

Blurred boundaries

From page 17

housing, rather than as a separate unit.

Many low priced terminals have multiple microprocessors incorporated, and most semiconductor manufacturers supply sets of chips for building a set of VDU electronics.

Micro-floppy discs are frequently incorporated in terminals, as are such facilities as data entry and programmable communications facilities.

The trend towards distributed systems will definitely continue and it has been forecast that peripherals will be high-level

language driven in the future. Another trend that will continue is the incorporation of self-test facilities, enabling the unit to diagnose its own fault condition.

The move towards more complicated electronics, with its maximum reduction in module parts, will obviously escalate reduce maintenance and simplify construction. Peripherals will most certainly tend to be more alike, as mentioned earlier, with variations according to application only.

Peripherals will tend towards small systems, rather than purely slave units, product hierarchical structures in distributed systems.

Disc revolution

From page 18

for around \$1,200 in high quantities.

Real innovation has come to this latter area with physically small units using 8 inch discs, again in the 10-30 Mbytes range, and at \$1,000-\$1,200 prices. Front runners in the 8 inch disc race are expected to be IMI and

Micropolis in the US and Data Recording in Europe.

Capacities are already being increased to 120-180 Mbytes for the larger 14 inch disc units and the low cost 8 inch units can be expected to quickly follow suit. IBM technology is already available to push fixed disc units up to 10,000 bpi and 700 bpi.

REPORTS FROM THE FOUNDATION

A framework for project management

WHEN a project "goes wrong" it is all too easy to blame the staff working on it at the time — like the unfortunate Greek messenger. The Ancient Greeks had the understandable, if irrational habit of executing the bearer of bad tidings.

So it is with computer projects — character assassination if not physical assassination being the order of the day. The symptoms of failure in a project are late running, cost escalation and a feeling of being out of control. The causes are most commonly incorrect design — a business problem has been wrongly specified or an inappropriate technical solution has been implemented leading to re-working, inadequate planning and possibly poor programming.

But notice when the problems become identifiable. It is usually towards the end of the project, during system testing, and the people most active at the time are, of course, the programmers. As a result, a great deal of attention has been directed at improving programmer productivity, at improving the construction of programs and at making the programs easier to maintain; all laudable aims but getting nowhere near the root of the problem.

The problems began much earlier — possibly as the project was being set up. So before looking at the techniques of project management let us establish a framework which is likely to lead to success.

All our education and training suggests that the best way of ensuring success is to get a good start; but a good start on a systems project is almost always a slow start. Systems are run by people and the relationship is complex. As a result things are not always what they seem. It is necessary to spend time understanding the real problem, and the work needs to be done by a senior and experienced analyst. Use your best staff for the initial investigations — never use trainees.

STRUCTURING PROJECT RESPONSIBILITIES

A computer system is not an end in itself. It only exists to support a business need. It follows that the line manager who is going to run the system must be involved in the design — in fact more than involved; committed to its success.

The user executive is a key appointment. He should be at director level and have line responsibility for the ongoing business system. His role is not full-time and he will delegate day-to-day involvement to members of his staff. He has, however, overall responsibility for the project, for ensuring that the business needs are correctly stated, and that the user department wholeheartedly supports the new system.

If a suitable user executive cannot be found, the project should be stopped. If nobody will sponsor it at this stage they are even less likely to do so later on when the going gets tough — as it does.

The project manager is the

full-time leader of the project. To be successful he needs to have a good technical knowledge and a sound business knowledge and be good at project management. Usually he is supplied by Management Services and it is up to the user executive to ensure any gaps in his business understanding are remedied.

However good the project manager, he always benefits from a second opinion. The job of the supervising manager is to provide such a second opinion.

ORGANISING THE PROJECT DEPARTMENT

A computer project requires a wide variety of skills: business analysis, systems design, systems analysis, programming, organisation and methods, work measurement, technical authorship, operations, training.

The project will also require more staff in the middle and end

comprehensive, allowing no gaps in the analysis; clear, uniform and unambiguous in application; enforced.

Setting standards of performance (which is what this is all about) is a key responsibility area for the head of department. He must think carefully before introducing them, because once introduced they must be enforced.

The corollary is obvious: if you are not prepared to enforce them there is no point in wasting time on a standards manual.

SELECTING THE RIGHT PROJECTS

What is the right size for a computer project? The question is not quite as silly as it may look at first sight — and there is an answer: Not much bigger than the last project we completed successfully.

Computer projects can be extremely complex and they

STAGES OF PROJECT DEVELOPMENT			
What to do		Survey the problem	
	Creative Phase		
How to do it		Evaluate Solutions	
Get it done		Specify in detail	
	Execution Phase		
		Program/Implement	

Figure 1.

than it did at the beginning. While we should strive for continuity we can see that team members will change during the life of the project. All this instability creates something of a man management problem, as by their nature people prefer a stable reporting environment.

The solution is to distinguish line management of the staff (pay and rations, development and progression) from the project management (mixed skills to solve a particular problem).

ESTABLISHING CLEAR GROUND RULES

If we are to get high quality work we cannot have all the members of the project team inventing their own rules as they go along.

We need to identify the various activities that need to be done and make sure that we set about every one in the best possible way. Whatever the standards are for (writing programs, system testing, writing procedure manuals, survey reports etc) there are common aims.

The standard should be simple to understand and work

always demand a high degree of technical and management skill. As they grow in size, the complexity grows in a way that seems to be exponential.

There is another reason also for limiting their size. It is difficult to maintain enthusiasm and momentum for an interminably long project — and it could be by the time it is introduced it is no longer solving the right problem.

Experience suggests that most projects should show results within one year and even the most complex within two years. That is not to say that very large projects are never undertaken; but a large project should be broken up into sub-projects which can stand alone and demonstrate progressive achievement.

This idea of breaking up a large problem into a more manageable size is a key to success in project management.

It is not quite as easy as it looks, however. If the division of work is carried out badly there may be too much interaction between the components — instead of within them. Getting it wrong adds complexity instead of removing it.

UNDERSTANDING THE NATURE OF COMPUTER PROJECTS

Computer projects have a creative phase and an execution phase, and the two are very different. The creative phase, at the start, is concerned with identifying the problem to be solved and deciding on a good technical solution which meets the real business need. (See Figure 1.)

The execution phase, which follows, is all about getting the solution installed — detailed specifications, programming and implementation.

The creative start, surprisingly, may take almost as long (in elapsed time) as the execution, but it only involves one or two people (with rather special skills). The execution may involve a small army of people providing a very different management challenge.

There is a second way of looking at computer projects which is equally important. Is the system input-driven or output-driven? An output-driven system (eg, management reporting, stock control, sales statistics) is very much easier to manage. Files already exist giving the database; there is little impact on the way people work; it is low risk, even when things go wrong.

Input-driven systems (eg, order processing, payroll, foreign exchange dealing) are substantially more difficult. Main files have to be set up and maintained; transaction files have to be set up and maintained; extensive control and error correction procedures are needed; reorganising and retraining of clerical staff is required; it is high risk, even when things go well.

A way of reducing the risk of project failure is to minimise the number of input-driven systems going live at one time.

CHOOSING THE PROJECT MANAGER

"Good management" in any sphere of activity seems to have three ingredients: technical ability, enough to be able to judge the quality of the work of subordinates; leadership ability, a desire and ability to get results; and conceptual thinking ability, able to take an objective stance, one step removed from the immediate problem.

Let us use this classification to see what qualities are required in our project manager.

During the initial creative phase, technical ability means having a deep understanding of the business problem together with a good understanding of systems solutions. Leadership ability is not, in this context, a matter of project team management but rather of handling user directors and staff; the ability to diagnose constructively.

During the execution phase of the project, the emphasis shifts. Technical ability means not only a sound computer knowledge but also an awareness of people and systems; the human interface and what can be achieved with a computer system. Leadership ability means giving out the right size tasks and

checking that they get done; a systematic recording of all agreements and meticulous attention to detail.

It is not often that all these qualities are found in one man; but if we are aware that they are needed we can build a more balanced management team. A project manager whose strength is attention to detail might best be supported by an experienced supervising-manager who is good at forward planning.

Of all the qualities, giving out

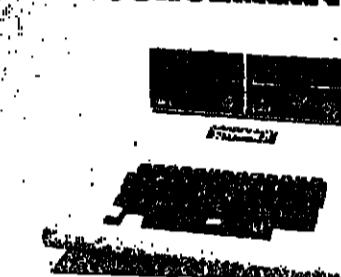
the right size tasks and then checking that they get done is the one to prize most highly in a project manager.

The quality to avoid is lack of success. In this business people do not seem to learn by their mistakes.

So do not pander to your instinctive sense of fair play by giving him a second chance; give him a different job which he can do well and get another project manager. It is kinder and more realistic.

PAGE 13

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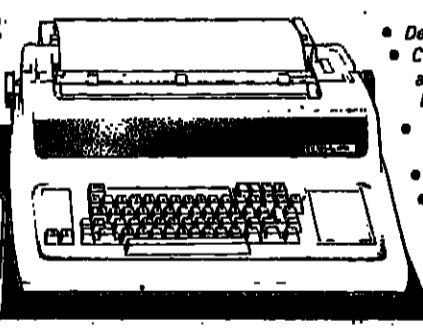
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BOOK REVIEW

Aims to teach well structured PL/I coding

Data structures and PL/I programming, by M. J. Augenstein and A. M. Tenenbaum. 643 pp. £15.35. Prentice-Hall International, 86 Wood Lane End, Hemel Hempstead, Herts.

ONE of the most attractive features of PL/I is its versatility. More often than not, if one has a complex programming task to perform or some tricky data manipulation exercise to undertake, this language will provide a mechanism to enable one to overcome the difficulty.

Because of its comprehensiveness, manufacturers' manuals and textbooks devoted to it tend to be fairly voluminous renderings.

This present book by Augenstein and Tenenbaum is no exception, and contains 630 pages of well-written easy to read text which is abundantly illustrated with a wealth of well-structured code free PL/I code.

The opening chapter deals with data structures and builds systematically from simple objects — such as numeric scalars, character strings and bit strings — through the various types of arrays to structures.

Having given the student an outline of the "simple" data objects that are available as primitives in the language, the authors continue in their second chapter by presenting an overview of programming in PL/I.

Here considerable emphasis is given to the use of good control structures — of which PL/I offers SELECT, DO...WHILE, DO...UNTIL, IF...THEN...ELSE, etc — the need for good program structure and the techniques of achieving these goals from appropriately formulated algorithms.

These first two chapters will make extremely pleasant reading for a practitioner and would make someone with programming experience and who wants to look at PL/I to see what it has to offer.

However, these chapters would not be of significant value to the novice in computing who has no prior knowledge of programming fundamentals.

Earlier chapters, having dispensed with the basic concepts of data structures, algorithms and programs, pave the way for later chapters dealing with the theory and implementation of stacks (Chapter 3), recursive processes (Chapter 4) and queues/lists (Chapter 5).

The reader is introduced to the idea of dynamic storage allocation through the use of appropriate program structuring — BEGIN and PROCEDURE blocks — and via the ALLOCATE and FREE statements in Chapter 6.

These concepts form a solid foundation for the more advanced discussion

that takes place in subsequent chapters. Based storage and pointers are introduced in Chapter 6, entitled "PL/I List Processing".

Chapter 7 deals with trees and graphs — an area where the advanced data structuring facilities of PL/I enables the unhindered implementation of quite complex structures.

Tree creation — binary, threaded, homogeneous, heterogeneous, etc — and traversal algorithms are presented along with their PL/I implementations and adequate illustrations of their practical applications.

The section of this chapter that deals with graphs and their applications is particularly interesting and presents some well-chosen examples that deal with flow problems and scheduling.

Sorting, searching and merging are probably some of the most frequently used computing/data processing operations. Their importance is reflected in this book by allocating two chapters to them — Chapter 8 to sorting and Chapter 9 to searching.

The chapter on sorting gives a concise taxonomy of sort methods, and a comprehensive coverage of the more important techniques such as radix, merge, address calculation, Shell, insertion, heap, tournament, bubble sort, quick sort, etc. The penultimate chapter is devoted to a study of searching techniques.

After covering the basic methods — sequential, index sequential, binary, etc — there is a section on tree searching and updating; here, the advantages of balanced trees are presented along with algorithms for rebalancing them.

Examples of the use of digital search trees, forests and tries are also included. This chapter concludes with a detailed discussion of hashing techniques and some practical case studies.

The final chapter of the text is devoted to storage management from the point of view of the language/operating system implementer. Many of the problems associated with the allocation/freeing of storage are described and techniques for solving them are presented.

The reasons for garbage collection, thrashing, fragmentation, compaction, etc are explained in lucid detail and many of the currently used storage management techniques — first fit, best fit, buddy system and boundary tag method — are outlined.

Each of the 10 chapters of the book contain a bibliography and reference section that enables the reader to follow up much of the detail of the material presented in the body of the chapter concerned.

Overall, the book has been well-thought-out and produced to an extremely high standard. From cover

Exposé of making academic decisions

Choosing and managing information systems for public administration by Greene Norris and Wallace Ewart. £7.50. Saxon House, Teakfield Ltd.

THE theme of the book, published in association with SP subsidiary Sclon, is an extensive, in-depth case study presented more as a teaching tool than text or training manual.

The arena is an institute of higher education which is supposed to be in the process of enhancing its DP facilities and incorporating the computer as a teaching aid.

The study, which forms the basis of a seminar, is certainly exhaustive. Proceedings are broken up into rounds complete with sundry subheads.

The academic nature of the study is emphasised by the DP managers' report which is heavily supported by advanced level algorithms.

Should such time-absorbing procedures be adopted by commercial installations, enhancement and upgrade decisions could

be subject to several years' delay.

Rather off-putting is the format of the book, which is a style perhaps more suited to an A4 sized publication than a conventional book size.

Mispellings and typing errors abound and are in fact featured on both the first and last pages.

In a section listing current machine types operating in UK universities, a reference code is given to large-scale IBM machines. There is, however, no related reference in the subsequent tables.

Midstream, the book suddenly takes a commercial break. Amidst the practical studies, there is a heavy promotion of Sclon with the suggestion that Sclon alone has expertise in offering consultancy in database technology.

However, the book does present for the dedicated reader a far-reaching "exposé" of decision making at academic level. As such it can be recommended.

ALAN SIMPSON

Growing threat to installations from Spooks

Spooks — the private use of secret agents, by Jim Houghan. £5.95. W. H. Allen, 44 Hill Street, London, W.1. Tel. 01-493 9471.

SPOOKS is not another item of our rapidly expanding computer jargon age: it is the title of a recently published book which, in a novel-like way, reveals the relationships of prominent people, organisations and contemporary events.

But "Spooks" is jargon; it is American slang for investigatory and surveillance agencies.

According to author Jim Houghan of this brilliantly researched 468 page report, our society has two histories, the public chronicle (the "Disney version") and a secret history, which has taken him four years to discover.

The US literary establishment which gave us "fac-

tion" writing or fictionalised facts also pioneered investigative writing or humanised facts, and Spooks is very people-oriented. It is packed with facts and characters, in a way comparable with a best-seller detective novel.

Even though it is not fiction, it is about the methods, and motives, tools and systems of industrial spies and Mission Impossible agencies, who most often work for the highest bidders, the multi-nationals and organised crime syndicates with access to high technology.

The book's assessment of security risks by industrial espionage from Spooks to DP systems, chillingly suggests that the most threatening sort of computer system penetration is the one threat least likely to attract attention: intrusion designed to obtain information, without interfering with both data and the normal function of the computer system!

Significantly, for some years Douglas Aerospace, Univac and other major US manufacturers recognised the threat from Spooks. This includes eavesdroppers who have developed "high-noise" sensory devices which can read a computer's contents by analysis of field-activity or electronic hum.

An even less publicised response to the Spooks comes from IBM which has invented the internal computer monitoring of environmental anomalies as a feature of the 370.

By backward-engineering techniques, IBM has also invented diagnosis and determine functions to counter ambient penetration with ring main telecommunications reporting.

Current state of the art research by ITT, Bell and RCA indicates that data-broadcasting systems pose a high security risk in transmission-booster stages, by both interception and eavesdropping.

The comment by IBM President Tom Watson that "IBM considers itself an extension of the US government" leads Houghan to suggest the mind-boggling possibility that the selective installation of "low-noise" computers throughout the world can result in the installing of Spooks — what the computer itself may be the spy.

For the author has discovered that the user may not know of the "response-back" feature in the computer, and further reports support this suggestion by documenting a history of end-user certificate violations and abortive legal prosecutions in *prima facie* computer espionage exposures in Europe.

However, much of this sensation-packed book actually weaves a homely trail, linking businessmen, politicians and criminals in networks of territorial franchises based on legal and illegal activities.

gratuitously enforced weapons, sex and drugs. Jim Houghan's history of two sides of the coin is credible and readable.

D. SCOTCHDOPOLE

In-depth research dossier of a high editorial standard

Electronics: the Market to 1982, by Peter Evison. International Management Reports, Financial Times; £50. 125 pp.

THIS report is 'one in the series of Financial Times International Management Reports, which are in-depth research dossiers of a high editorial standard, especially commissioned by

the Business Publishing Division of the Financial Times. Its author Peter Evison, is a consultant to Quartermaine House, itself the technical publishing company associated with G. V. Planer, noted venture capitalists and new-technology business developers. Its pedigree is therefore assured.

All this, particularly at the non-trivial price of £50

for 100 working pages, naturally tends to make a reviewer read critically, sharply on the look-out for even minor flaws. I am glad to say that the work largely stands up to this hypercritical approach and with regard to clarity of layout of the many tables of projections it contains and the readability of the snatches of informed comment provided in amplification of the bald figures, fulfils well the purpose of such a dossier in providing a consolidated, condensed, simply structured and easily digested "ready reckoner" to a number of disparate research and statistical sources.

Not surprisingly, within the computer sector the market for small (mini- and micro-) computers shows by far the biggest growth and Evison correctly emphasises the overall impact of the microprocessor on this whole sector (a theme taken up frequently, and rightly, in other sectors, particularly components).

It is this small computer area in which one could feel safest questioning the "no surprises" premise at the start of the report. If we assume an average price of £50,000 to \$100,000 for his projected 1982 market figure of \$10bn implies 100,000, to 200,000 units worldwide in that year: I should not be



Castell

surprised if this is hit well before 1982.

The single clear message that comes through this otherwise comprehensive review

of the exponentially-increasing application areas of electronics is — yet again — that this technology is just one, maybe the most critically powerful vehicle for the real product now suddenly in increasingly heavy market demand: information.

At £50, this particular chunk of well-produced information should be most useful for consultants, marketing managers, product designers and the like to enable them to get a quick fix on the manifestations of their own information technology markets to come, for which market will not be involved with information by 1982?

Dr STEPHEN CASTELL.

Personal computing is coming of age

Do-it-yourself computing: the personal computer comes of age, edited by Martin Banks. Input Two-Nine Ltd, 7 Banstead Road, Purley, CR2 3ER. £9.95. (IDPM members £8.50.) 119 pp.

FEW areas of computer technology have "come of age" so dramatically as the personal computer. It hardly seems a year ago that "Do-it-Yourself" computing arrived.

Since then, the micro has made all the industry's noise, with the government

being just as keen to share the action as the most dedicated hobbyist.

Keeping pace with micro development technology is an extremely difficult task — particularly for publishers whose latest edition could well be overtaken by events even before it is released. However, this publication succeeds in beating the credibility gap.

Credit in large measures must go to the compiler, CW Micro News Editor Martin Banks. Being closely involved in the micro-

computer world, Banks has produced a relevant, up-to-the-minute "State of the art" survey.

Setting the scene, Michael Anderson of Imperial College explains what microcomputers are and what can be done with them. Viewdata receives attention from Peter Fletcher, IPC viewdata manager, while the possibly thorny aspect of packaged software is covered by Ian Powers of Motorola.

For many readers, maximum benefit will be found

in the supplements. Costing, evaluation and manufacturers' listings, are of great interest, as is a fully comprehensive microcomputer glossary.

For those of us who may have wondered what "daisy chain, handshaking, nesting, cycle stealing or crowbars" are, the answers are provided.

There could well be a need to publish such a volume annually and we can probably look forward to an update this time next year.

NEVILLE TAYLOR

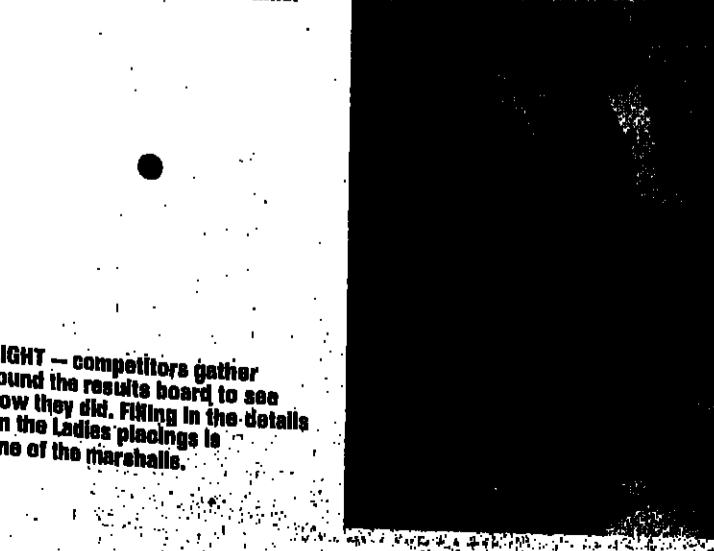
Gail is all set for double at Palace



Individual winner of the Ladies events was Case secretary Gail May. Gail, who is based at its Bradford offices, finished on 81 1/2 points.



ABOVE — ready for the off in the Men's short sprint. The object is to clock up as many lengths across the track in a fixed time.



RIGHT — competitors gather round the results board to see how they did. FILING in the details on the Ladies' placings is one of the marshals.

SECRETARY Gail May stormed home to win the individual events by a 9 point margin at the North Thames heat of Computastars on Saturday.

Gail, who works for Case's Bradford office, was last year's overall winner and this result must put her in a strong position to carry off a double this year.

Held at the Coptall Stadium, Barnet, the event ran with its now accustomed smoothness, despite a shortage of marshals. This led to an unusually large number of protests.

Case were helped into first position by Gail, who runs with Alredale and Spen Valley AC, thus stopping London Transport from scooping all the honours. LT were second and third in the Ladies team events and first in the Mens events, pipping Midland Bank by just three points.

In the Mens individual events, the margins were the tightest of the day with Midland Bank's Phil Bamgboye easing home over LT's Trevor Goodman by 1 1/2 points, thus taking the trip to Crystal Palace in September.

The trophies were provided by Wright Air Conditioning who sponsored the competition in conjunction with Computer Weekly. They were presented by Wright's managing director Colin Brooke and his wife Sheila.

The Scandinavian Airlines team, who flew in specially from Copenhagen to compete in Computastars, came in sixth.

RESULTS

Ladies team events — 1. Case, 169 1/2 points; 2. London Transport I, 141; 3. London Transport II, 126; 4. Lola; 5. Midland Bank; 6. Scandinavian Airlines System; 7. London Borough of Kensington & Chelsea; and, 8. Edwaldo.

Ladies individual events — 1. Gail May, Case, 81 1/2 points; 2. Lesley Wilson, Midland Bank, 52 1/2; and, 3. Alyson Maund, London Transport, 42.

Mens team events — 1. London Transport, 132 1/2 points; 2. Midland Bank, 129 1/2; 3. Heinz, 120; 4. Gordon & Gotch I, 113 1/2; 5. CMC I, 102 1/2; 6. Lola; 7. Honeywell; 8. Blackwell's; and, 9. CMC II.

Mens individual events — 1. Phil Bamgboye, Midland Bank, 36 points; 2. Trevor Goodman, London Transport, 34 1/2; and, 3. Colgate, Gordon & Gotch I, 30 1/2.

TEAMS

Atlantic Computer Leasing Co., Blackwell's British Rail, Case, CMC, Edwaldo Distribution, Gordon &

Gotch, H. J. Heinz, Honeywell Information Systems, London Borough of Hounslow, London Borough of Kensington & Chelsea, London Online Local Authorities (Lola), London Transport, Marcol Computer Services, Midland Bank (London), Robert Horne Computer Services, Russell Laboratories, Scandinavian Airlines System, Smith Kline & French, and Texaco.

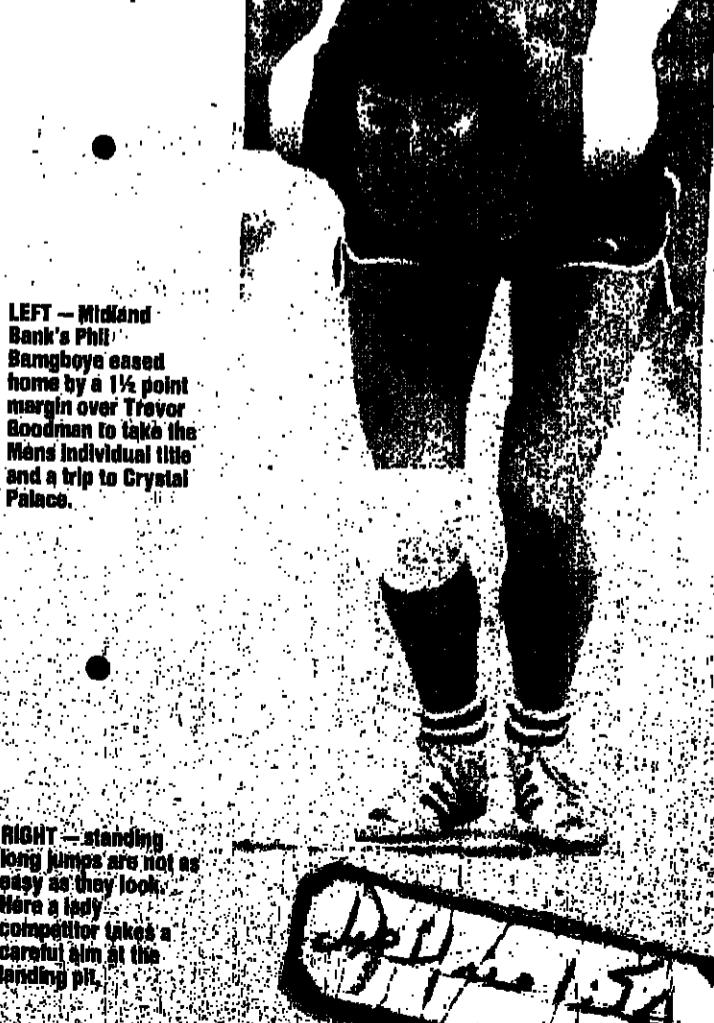


Easing home by three points in the Mens team events was London Transport with 132 1/2. They are: Fred Iles, Jeff Snares, Trevor Goodman and Ron Levin.

COMPUTASTARS

NORTH THAMES HEAT

ABOVE — the SAS team, who flew in specially from Copenhagen, ponder their fate in front of the main stand. The Ladies team finished sixth while the Mens' team was unplaced.



LEFT — Midland Bank's Phil Bamgboye eased home by a 1 1/2 point margin over Trevor Goodman to take the Mens individual title and a trip to Crystal Palace.

RIGHT — standing long jumps are not as easy as they look. Here a lady competitor takes a careful aim at the landing pit.

Appointments

THE INDUSTRY NEWSPAPER FOR DP PROFESSIONALS

Appointments

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When not actively involved in training, candidates will be engaged in Consultancy roles and should therefore possess skills in Systems Analysis and preferably have experience of at least one of the following: mini computers, COBOL, BASIC, PL/1, DOS/VS, Database or On-line Systems. A minimum of three years in Data Processing is essential.

These are Senior Positions in a highly successful organisation. The company offer a good pension scheme, expenses and salary in keeping with a Senior Position.

Ref: SE1/0507

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Ref: E11/0507

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Ref: E2/0507

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Ref: SW1/0507

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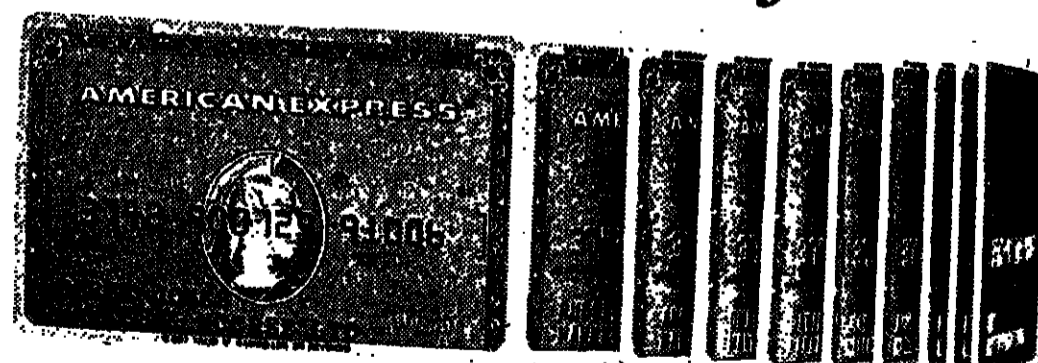
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Preference will be given to candidates with experience in designing and programming on-line systems, particularly on local government applications.

Relocation expenses up to a maximum of £500 are payable, as is a separation allowance of up to £10 per week for married officers.



Application form and job description from Personnel Officer, Knowle, Sidmouth. Telephone Sidmouth 8861 (STD code 039 85). Closing date 20 July, 1979.

EAST DEVON DISTRICT COUNCIL

Leeds

POLYTECHNIC

School of Accounting and Applied Economics

LECTURER II/SENIOR LECTURER IN SYSTEMS ACCOUNTING

The above vacancy is in a team specialising in the application of systems and data processing methods to financial and economic systems.

Candidates must possess a relevant degree and/or professional qualification. Professional experience in commercial systems and data processing is essential.

School of Mathematics and Computing

LECTURER II IN COMPUTING

required to join a team teaching computing throughout the Polytechnic.

Applicants should have a relevant degree or professional qualification and industrial or teaching experience.

Salary Scale:

Senior Lecturer: £6597-£7701 (band) - £8253
Lecturer II: £4470-£7148
+ £8 per month

Details from:

The Services Officer, Leeds Polytechnic, 100-102, The Arcade, Leeds, LS1 3HE. Tel: 0532 482255. Closing date: July 24, 1979. Please enclose CV.



TESCO is one of Britain's largest retail organisations. It's also Britain's fastest growing retail group, due in no small part to the effective way in which the company uses its massive computer complex. Because of this success and continuing expansion, we need to increase our computer staff. Right now, we are looking to slot in a number of new faces at our Head Office in Cheshunt.

We are looking for programmers with one or more years sound COBOL experience and there are considerable opportunities for more senior people. We offer multiple discipline project teams a wide variety of advanced projects and programming with TSO IBM's interactive programming facilities.

If you have one or more years experience in Systems Analysis, with or without supervisory experience, we can give you the opportunity to work on one of our many and varied projects within our constantly expanding computer division. Salary and prospects are excellent.

DB/DC Specialist. You will have had about a years experience in database administration and IMS DB/DC programming with responsibility for system design and be keen to pass on that expertise to others. You will provide support for IMS applications with the help of the very latest IBM hardware and software including IMS Fast Path and HSP Data Manager.

Word Processing Analyst. A senior Systems Analyst with experience in O & M as well as knowledge of office equipment and techniques. Previous experience of Word Processing is desirable, but not as essential as the ability to communicate and get on with people as you will be expected to make a major contribution to the development of WP in Tesco.

IIS & Program Products Analyst. Considerable experience of IBM's Interactive Instructional System (IIS) is essential as you will be the company's expert in its use; you will also examine other packages for use within the company; install and control them.

You will need in-depth design and programming experience, preferably with knowledge of on-line and database facilities to be able to advise development teams on security and on interface and restart/recovery procedures.

Acting in an advisory capacity to specialist project teams, you will need good all round experience of systems analysis, design and programming ideally including on-line and database background.

You will ideally have a Systems and Programming background and be required to train others with or without DP experience in Systems Analysis. You will be one of a highly skilled team specialising in training, with the opportunity to use Interactive Instructional System (IIS).

Due to the current expansion of our Electronic Point of Sale (EPOS) project, we require Analysts and Senior Analysts, ideally with retail experience, and Programmers and Senior Programmers with at least two years IBM experience with COBOL or Assembler.

That's quite a shopping list we've got. And we're prepared to pay for the people we want. You'll find the salaries at Tesco are at least in line with the competition at best, way ahead. There's a full range of benefits too, including relocation expenses to Cheshunt, a pleasantly rural environment even though it's just 35 minutes from central London. Find out more about the Tesco way with computer systems, and the way you could fit in.

Contact Fred Rayers, Computer Services Manager, Tesco Stores Ltd., Delamare Road, Cheshunt, Herts. EN8 9SL. Telephone: Walkham Cross 32222.



Software Programmers

Solihull, West Midlands

The Midlands Region of the Central Electricity Generating Board in Solihull has vacancies for software programmers. A 256K 1904S is installed together with two front end processors and a 48K ICL 2904. Future developments include the installation of a large 2900 series configuration in a new computer room next year.

Conditions of service are attractive and starting salaries will be within the range of £4,660 to £8,130 (currently under review). Applicants male or female, should have experience in at least two of the following areas:

George 3
1900 Telecoms
Front End Processors and Networks
Sizing Techniques and Tuning

VME/B
2900 Telecoms

If you are interested in joining the Technical Services Section of an installation committed to 2900 and supporting a large communications network please write, quoting vacancy number CW 203/79MR, and giving full details of career to date to the Personnel Manager, Central Electricity Generating Board, Midlands Region, Haslucks Green Road, Shirley, Solihull, West Midlands B90 4PD by the 10th July, 1979, or alternatively Phone T. Wales on 021-744 8511, Ext. 273 for more details.



CENTRAL ELECTRICITY
GENERATING BOARD
Midlands Region

App 1/20

You're holding us up!



Our clients have an exciting development plan that will convert financial and production systems into a total Teleprocessing Network. The three key areas that could interest you are:

SYSTEMS ANALYST £5000-£5250

You are probably proud of your analytical skills but tired of repetitive routine projects. You understand commercially orientated computing, you just need the opportunity to develop.

PROGRAMMER £4700-£5000

Our client will train you in PL/I or RPG II if your last 18 months have been with any other high level commercial language. This opportunity is ideal for a young programmer looking to break into a "hands on," distributive processing environment.

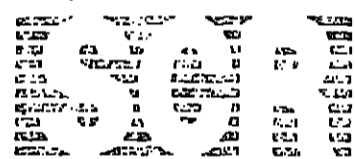
SENIOR ANALYST £5500-£5700

You are not a boffin, you are creative and able to talk to all levels of users. You feel you have the ability to control a small team that you have selected. This is an ideal step into management.

You will be based in modern, elegantly designed premises working alongside enthusiastic staff, enjoying these benefits:

- * superb subsidised canteen
- * generous overtime rates
- * first class pension scheme

For more details of these opportunities telephone ALAN CARNELL ON 021-236 3781 (24 hour answering service). OR 021-784 6063 (evenings and weekends).



London 01-935 0671 3 Mandeville Place, Wigmore Street, London W1M 5LB
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA

Specialist Computer Recruitment Ltd

Calma is an American-based company specialising in producing computer systems for design applications. These applications cover the areas of integrated circuits, printed circuit boards, mapping and mechanical design. We are growing very rapidly and will shortly open a new European customer support facility located in Kingston, Surrey. To support this expansion we require the following additional staff:

1. APPLICATIONS ENGINEERS

Candidates should possess experience in either mechanical design or printed circuit board layout, together with some software knowledge. Familiarity with Data General RDOS would be an advantage.

2. FIELD SERVICE ENGINEERS

Locations, Edinburgh/Glasgow and Manchester. Applicants should possess several years' experience of computer system field maintenance and be capable of working on own initiative. Experience of plotting equipment and/or mini-computers would be an advantage.

3. HARDWARE TECHNICAL SUPPORT

Applicants should possess several years' experience as computer field service engineers. Experience of mini-computers or plotters would be particularly relevant.

4. HARDWARE REPAIR SHOP TECHNICIANS

Although previous computer experience would be desirable, applicants possessing a sound practical and theoretical grasp of electronics would be acceptable, as full training will be provided.

COMMUNICATIONS NETWORK MANAGER

This position is likely to prove attractive to an experienced computer field service engineer who has specialised in communications and now feels able to manage and support a small team responsible for a large, complex comms network, linking several large computer centres and associated terminal equipment.

Conditions of employment will reflect the high grade of people being sought, and will be very competitive.

Please write in first instance to:—

CALMA COMPANY
10 Barley Mow Passage, Chiswick
London W4 4PH
or phone
01-884 6477

A chance to combine your problem-solving skills and technical expertise

with CTL, one of Britain's largest independent business computer manufacturers, responsible for the successful 8000 Series Systems. We are growing fast and have a number of opportunities on the support side of our Customer Services Division:

PRODUCT SPECIALIST - HARDWARE up to £7K + car allowance

to become our Technical Specialist on current products, provide cost effective servicing policies and liaise closely with the Marketing and Design divisions on the development of new products.

Candidates, HNC or degree level, should ideally have up to 5 years' hardware products experience, including peripherals and support in a service/design environment. Knowledge of programming, microprocessing or appreciation of systems software is essential.

SUPPORT ENGINEER - SOFTWARE up to £6K + car allowance

to act in a Project Manager role for systems implementation, and then to monitor and advise on the use of the operating systems and applications software. There will be considerable technical contact both with customers and our own engineers.

Candidates, HND or degree level, will have a minimum of 2 years' experience in a computer or associated industry in the implementation and application of software systems.

JUNIOR SOFTWARE SUPPORT ENGINEER £4.5K - £5.5K + car allowance

to be responsible for activities relating to the provision of systems support to the customer base and our field engineering staff, including involvement with product development, performance and testing exercises and specific monitoring of customer situations on site.

This career opportunity would ideally suit an HND student or someone with at least 1 year's experience in support/design software environment or computer operations.

All posts, based at Hemel Hempstead, are open to men and women, and offer a real opportunity to join a growing British computer company developing mini-computer systems in software and hardware. Salaries are negotiable according to experience and will also include a car allowance of £950 p.a. Excellent career benefits and career prospects.

Please write, or telephone, for further details/application form to Jim Parls, Personnel Officer, Computer Technology Ltd., Eaton Road, Hemel Hempstead, Herts. HP2 7EO. Tel: (0442) 3272.



The British Computer Systems and Software

APPLICATION PROGRAMMERS

Have you considered becoming a lecturer?

We're interviewing right now!

We have many excellent career opportunities at our training school in South Harrow for application programmers who would like to become lecturers. It would prove to be a very logical next step in your career... even if you've had no previous lecturing experience.

Would you enjoy teaching others?

There's a great deal of job satisfaction in passing on your skills. They benefit from your valuable experience and at the same time you'll learn more about operating systems than you would if you stayed a programmer. You'll need to know *exactly* how they function and keep abreast of developments.

Do you have the personality for the job?

Obviously you may doubt your ability to teach a class of professional people. But if you've got it in you, we'll bring it out... especially if you have natural leadership qualities and a degree of skill in presenting ideas in a coherent way.

The company you're joining.

We're one of the world's foremost computer companies with over 63,000 installations world-wide. Our products are used for commercial applications through to complex instrumentation control, industrial automation, data acquisition and scientific tasks. Because of our rapid growth rate we need more lecturers to teach both our own staff and customers.

Act now while this is still fresh in your mind.

Phone or write to Janet Field at the address below.

JOIN THE WINNING TEAM



Data General Limited, 3rd & 4th Floor, Hounslow House, 23/27/31 London Road, Hounslow, Middlesex TW3 1PD. Tel: 01-572 7455.

SUNDERLAND POLYTECHNIC FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL, ELECTRONIC & CONTROL ENGINEERING RESEARCH ASSISTANT

Applications are invited from recent graduates or students graduating in 1979 for the post of Research Assistant to work in the field of parallel processing with microprocessors. Prospective candidates should hold or expect to obtain a good honours degree in any of the following disciplines: Electronics, Control Engineering, Computer Engineering or Mathematics.

Candidates will be expected to register for a higher degree. M.Phil./Ph.D. Telephone enquiries can be made to K. M. Abbott, Tel. 0191 78191, Ext. 16. Salary for this post, which is payable for two years from 1st September, 1979, with a possible extension up to three years, is £2,778 to £3,054 per annum (under review). An application form may be obtained from the Personnel Officer, Sunderland Polytechnic, Chester Road, Sunderland, SR1 3SD, and should be returned as soon as possible.

WESTFIELD COLLEGE (University of London)

CASE Studentship with INMOS in MICROPROCESSOR DESIGN

Applications are invited from those who have for a short time held a good honours degree in Computer Science, or related subject. The successful applicant, who will be expected to register for a PhD, will divide his time between the University and the Bristol laboratories of INMOS.

The research goals are not merely to design a microprocessor, but also to develop relevant simulation techniques and study the design-simulation cycle.

Applicants should write or phone Dr. Peter Challen, Computer Science Department, Westfield College, Kidderpore Avenue, Hemel Hempstead, Herts. HP2 7EJ (0442 3272).

Programmers

Bristol

£4120 - £5470 (under review)

Applications are invited for the above posts in the Computer Services Branch of the Resource Planning Department based at Regional Headquarters, Badminton Down, Bristol.

The successful candidates will form part of the programming team within the Development Section of the Computer Branch. They will work closely with Senior Programmers to code, test and document programs assigned to them as part of the planned development of systems.

The present hardware consists of two ICL 2980's running under DME with magnetic tapes, discs and supporting numerous terminals. Operation is under George III with data drive, Communication Manager and TPS in regular use.

Applicants should preferably be

qualified to degree or equivalent level and should have at least 2 years computing experience. Fluency in the COBOL programming language is essential and a working knowledge of TPS and structured Programming Technique will also be advantageous.

Terms and conditions are those expected of a large organisation and include contributory superannuation scheme, sickness benefits and generous holidays.

Applications on form AF/1 obtainable by ringing Bristol 848236 (during office hours) or by writing to the Personnel Manager, Badminton Down, Bridgewater Road, Bristol BS13 8AN, to whom they should be returned quoting reference 408/79/CW: by not later than 24th July, 1979.

Central Electricity
Generating Board
South Western Region



Sales Executives

North West

£16,000 + Car

A major International computer manufacturer with a well established U.K. operation wishes to recruit additional Sales Executives to be based in North West England.

The product line is well proven and highly competitive both in respect of price and performance. Software is similarly well proven and the sales teams are extremely well supported technically on a local, regional, national and international basis.

These positions offer excellent scope for ambitious sales professionals who wish to advance their overall prospects in a stimulating environment.

Candidates should have a first class record of success selling mainframe systems or distributed networks. There are territories available both within specifically the manufacturing industries area and also the general commercial sales regions.

Excellent salary plus commission will give on target earnings c. £16,000. A car will be provided and relocation expenses reimbursed where appropriate.

Contact your nearest office quoting reference CW/79037.

Ivor Norton Management Services Ltd Recruitment Consulting Division

52 Shaftesbury Avenue, London W1V 7DE P.O. Box 63, Copthall Tower House
01 734 8862 (24 hour answering service) Harrogate HG1 1TS, Tel: Harrogate 66629



Computer professionals required

Systems Designers Limited specialises in the provision of consultancy and software services to users of mini and micro computers in process control, communications and defence. The Company has recently been awarded contracts in the Middle East, Belgium, Germany and the USA.

To continue our expansion, further experienced real-time programming staff are required for assignments of two years in America.

\$20K to \$30K per year
Two-year contracts with terminal bonus
Generous relocation assistance
Settling in allowance
Free Medicare
Position within SDL (UK) on return

If you have between two and seven years' real-time programming experience on mini or micro computers and are interested in broadening your experience, please write to, or phone,

Cornelia Rison
Systems Designers Limited
Systems House, 1 Pembroke Broadway
Cambridge, Surrey GU1 5 2XH
Telephone: Camberley (0243) 82344



JBA**Communications Consultants**

Scandinavia up to £16,000 package
A large and well established computer services organisation with offices in Scandinavia have current vacancies for staff to work on sophisticated network projects.
Applicants must have at least two years communications experience preferably on IBM equipment such as 3033, 3705, 4300 using SNA. As an alternative the company would consider candidates with a background of IBM Software e.g. MVS, CICS related to communication systems.
Excellent opportunity to work in Scandinavia on new technology projects.
Contact: Jim Baker

Real-time Communications

Richmond & Europe Salaries to £9,000 + benefits
Rand Information Systems Ltd., a highly profitable systems house have taken a recent decision to expand their communications systems software business. They are currently carrying out a specific feasibility and design study on behalf of an international company for a large communications network. The initial positions being created for this and other projects, are:-

- * **TECHNICAL CONSULTANTS** - with upwards of 5 years software design and implementation experience.
- * **SPECIALIST PROGRAMMER/ANALYSTS** - with between 3-5 years, preferably real-time software design experience.
- * **PROGRAMMERS** - probably Graduates, with around 18 months experience in this field.

Above average salaries are offered, in a generous remuneration package which includes free life assurance, BUPA and non-contributory pension.
Contact: Andy Wright

Message Switch Development

City Based to £7,000 neg.
Opportunities exist for Assembler level programmers to join a small team of software specialists, working on communications networks. Candidates should be familiar with the design and programming of message switch applications on a mini computer or a micro-based system.
Graduates with limited experience will be considered for trainee positions.
This is an excellent opportunity to work on new technology including micros.
Contact: Margaret Stevens

For further information on any of the above vacancies, please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.
JAMES BAKER ASSOCIATES, International Personnel Consultants.
16 Maddox Street, London W.1. Tel: 01-491 4478

INSURANCE COMPANY**Systems Analysts**

South of England

Salaries up to £6,200 + mortgage subsidy + non-contributory pension + free permanent health scheme + low interest loans + subsidised canteen and sports/social club + full relocation expenses + other benefits.
A very attractive prospect for career-minded Analysts to continue progressing a growth-orientated modern company putting its data base and IT systems, promising exciting design and development work, well into the future.
We are keen to hear from Analysts who have a sound business background, a good knowledge of COBOL and experience of systems development over two to three years, ideally in an accounting, financial or banking environment.
Contact: Mike Creamer

Programmers & Analyst/Progs.

South Midlands up to £6,600
We have been retained by a well known financial firm to recruit a number of Analyst/Programmers and Programmers to work on the development of commercial systems in a dynamic and expanding environment.

There are vacancies at several levels but all applicants must have a sound background of COBOL on a mainframe, at least one year for the junior positions and three years for the more senior positions on mainframe applications preferably manufacturing, stock control or accounting.
This is a real opportunity to work in a friendly and professional installation. Salaries are negotiable according to experience. Relocation assistance available where appropriate.
Contact: Jim Baker

PDP 11/BASIC + Programmers

Mid-East Beds. to £6,000 p.a.
One of the few U.K. construction companies to have increased profitability over the past year, has two vacancies for experienced BASIC + programmers to join its buoyant, expanding P.D. department. The kit consists of both an 11/60 and an 11/35 - the latter used almost entirely for development, with each technician having a dedicated workstation.
The D.P.M. believes strongly in giving his staff all round responsibility so once the successful candidates have proved their worth, complete projects are likely to be assigned.
Competitive salaries, regular merit and cost of living increases, a bonus scheme, "in-house" swimming pool and sports facilities, plus full pension all form a package well worth working for.
Contact: Andy Wright

McDowell, Knaggs

COMPUTER RECRUITMENT, TRAINING AND CONSULTANCY

WORCESTERSHIRE, GLOUCESTERSHIRE

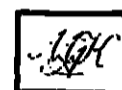
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WHY SHOULD YOU READ THIS ADVERT?

Because there are 'n' hundreds of jobs advertised weekly in the computer and national press and it's quite a task to sort through them; on the first pass trying to understand what each ad is trying to say; on the second pass trying to evaluate the job in its entirety and finally trying to decide if it might be the one you are looking for - perhaps you are not looking specifically but are just interested in what's around. We have the advantage in that having talked to you (interactively) about your background and requirements, we can then map those on to the vacancies in the above areas - a far easier process (and with a higher hit rate chance) than trying to reply or even deciding whether to reply to a specific printed vacancy.



Phone now for an informal discussion or write to **DON KNAGGS** on WORCS. 427077 (SEWDELEY 400036 evenings, after 7 p.m. on w/e) at THE MOUNT, 1 ST. JOHN'S, WORCESTER.

SENIOR PROGRAMMERS

Riyadh, Saudi Arabia

The Civil Service Bureau of the Government of Saudi Arabia has developed a computerised Personnel and Payroll Data Base System, to handle reports on salary administration, personnel motivations, education planning, placement selection and manpower development.

Successful applicants are expected to participate in implementing this System, as well as develop further Sub-Systems, using IBM 370/158 OS/VS, IMS.

Requirements: a minimum of:

- College degree in computing.
- Seven years' COBOL programming experience with the last three years in Data Base applications.

Benefits:

- Attractive salary depending upon qualification.
- 45 days' annual leave.
- Air travel for self and family.
- Housing and Transportation allowances.

Correspond to (no later than Aug. 15, '79):

Director
Data Processing Dept.
Civil Service Bureau
Washim Street
Riyadh, Saudi Arabia

RPG II PROGRAMMER

(TRAIN TO ANALYST/PROGRAMMER)

VICTORIA SW1

to £6,500

A minimum of ONE YEAR'S RPG II experience could be your passport to SYSTEMS ANALYSIS training on this IBM System 34, which has Real-Time architecture and currently supports eight local terminals with a Remote terminal coming on-stream next month.

Our clients are internationally known and market leaders in their field. Current and future work includes both On-Line and Batch systems.

Conditions of Employment include Non-Contributory Pension, a Realistic Bonus, Staff Discounts on Group Products, Free BUPA and LVA.

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Q.E. £12,000+ PLUS CAR

S.E. ENGLAND

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PACKAGE: £16,000 + CAR

This successful European mini-computer manufacturer wishes to recruit first-rate salesmen to sell to the top 1,000 companies where their products have already made them world leaders. Basic salary will be £8,000 with guarantee of around £3,000. There is a genuine chance for promotion and this is a really good deal for the right salesman with previous business systems or small machine experience. CW 27/4

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Q.E. £8,500 + CAR

C. LONDON

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TOTAL PACKAGE TO £9,000 + CAR

W. LONDON & C. LONDON

Join a major Service Bureau which not only sells Timesharing services and business packages of all types, but also sells DEC oriented distributed processing systems. Vacancies exist in LONDON and the HOME COUNTRIES for people with systems support experience to take TOTAL charge of existing clients and develop them. Basic salary between £4,500 and £6,500 for people with good Business Systems experience. Please apply now and enjoy a career with a real future. CW 27/1

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Join a company really going places where over half their salesmen earned £18,000 last year. Their products are amongst the most advanced interactive DP systems in the world, having a nine-fold increase in performance across their range of CPUs. They also offer a very efficient range of compilers and operating systems. Vacancies exist in CENTRAL AND WEST LONDON, BERKSHIRE & MANCHESTER with basic salaries between £8,500 and £9,000. CW 27/3

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One of the world's leading manufacturers and mini manufacturers have successfully launched a new range of small computers and is now seeking more salesmen to continue their tremendous success. Sales people need to have that motivation to sell in a commercial environment where rewards are there for the trying (a background in manufacturing or distributive trades is advantageous). Their range of computers also offers a variety of software plus total systems support from their excellent systems staff. Apply now and join the leaders. CW 27/5

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ENIGH + CAR

NORTH ENGLAND & HOME COUNTRIES

One of the biggest independent intelligent-terminal manufacturers in the U.K. with a very large and well-established customer base requires several experienced salesmen. They will sell in the interactive and BBT market places where their experience of data communications, systems and their motivation will ensure their success in a competitive environment. The company, which is one of the top 500 in the U.S.A., will offer a salary package at the top of the market plus other equally attractive large company perks. CW 27/7

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Recruitment Consultants
UNIVERSAL COMPUTER ASSOCIATES LIMITED

01995 3883 (01958 6138 Evenings)

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Systems Designers

Rural Kent

£8-10K

Relocation Expenses

+ Mortgage Assistance

Our client is part of a famous financial organisation with offices in the provinces and abroad.

Their principal office in Kent contains a sophisticated mainframe together with front end processors and links to a complex terminal network.

The company currently is developing large scale on-line and batch systems and is expanding its hardware so that new applications can be developed.

To spearhead these new developments they need to recruit two first class systems designers to develop the projects from feasibility through to implementation.

Ideally, candidates should be aged between 25 and 35 with a good academic background. It is essential that they have designed and implemented at least one major system in the financial/commercial sector and have had close user contact at all levels.

This is an ideal opportunity to join a really progressive company who are one step ahead of their competitors and with your assistance will keep this lead well into the 1980s and beyond.

To discuss these positions in more detail contact Yvonne Warren quoting ref. YW 2456.



**Lloyd Chapman
Associates**

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Contract FORTRAN Programmer

Experienced Programmer with a minimum of 3 years' FORTRAN on any machine. 6-month minimum contract, immediate start.

For further details contact:
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Rendek
Recruitment Consultants

Applications Support Engineer - Europe

Computer Terminals

This important new appointment in our expanding terminal sales operation involves responsibility for providing our European Field Sales Team with technical and applications support for our range of printers and teleprinters. Other responsibilities will cover analytical and counselling support on technical matters for distributors and OEM customers throughout Europe, and ensuring that our products meet various Government and safety standards. The successful candidate will, however, be responsible for providing more than just a technical support function since he or she will be part of a strong selling team. An ability to demonstrate technical self-sufficiency and initiative is essential together with experience in one or more of the following computer related fields: data communications, computer peripheral file protocols, hand-shaking procedures and distributed DP, plus a working knowledge of hard and soft microprocessors. Although the appointment is based at the Company's head office in London, it will call for extensive travel in Europe and a working knowledge of French or German would, therefore, be useful, although not essential.



An excellent salary, terms and conditions will be offered.
Please send full career, education and personal details to Mrs. J. I. Standfield, Personnel Manager, Park Lane, 111 Park Road, London NW8 7JL.

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Career Specialists and Consultants for
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021-252 2251

We're successful because our staff are

Data Logic operates at the forefront of computing, applying the very latest hardware and techniques to practical commercial problems. We cover the range from mainframes to the smallest computers. We are leaders in the use of microprocessors for applications that not so long ago required far larger machines.

Many of the systems we supply go far beyond providing extra speed and cost savings. They will revolutionise the way the user organisations operate. Several projects involve dispersed networks of ten or more minicomputers. Our largest turnkey system incorporates twenty-three machines and close to three hundred display terminals across the country — a totally new system which will serve almost every function within a leading company. A new police contract involves the first use in the UK of a mini for a complex data retrieval

application — with our own advanced methods for rapid, generalised record searches.

The exceptional scope and quality of work is important to our staff. We can match their individual experience to their projects. Equally, we can ensure that each project adds to their experience. As computing itself develops, so do they.

Over the past year Data Logic has grown dramatically in size, in scope of work and in reputation. Our expansion has meant unrivalled opportunities for career progression. We are not prepared to promote people before they are ready for it. But when they are ready — and we give all the assistance we can — the positions as senior programmer, senior analyst, project manager and consultant will be there waiting for them.

The reason is simple. We know that we are successful only if our staff are.

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(Ref PS/32/CW) For mainframe, minicomputer and mixed processor systems, usually supporting terminal networks. Increasingly Data Logic's turnkey projects involve minicomputers at multiple sites.

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Salaries will be highly competitive and a company car is provided to staff at senior team leader level or above.

There are vacancies at our Greenford, Birmingham and Manchester offices.

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(Ref PS/33/CW) For both mainframe and minicomputer projects which include commercial applications, monitoring and control, and scientific analysis.

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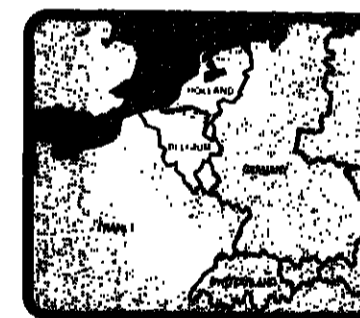
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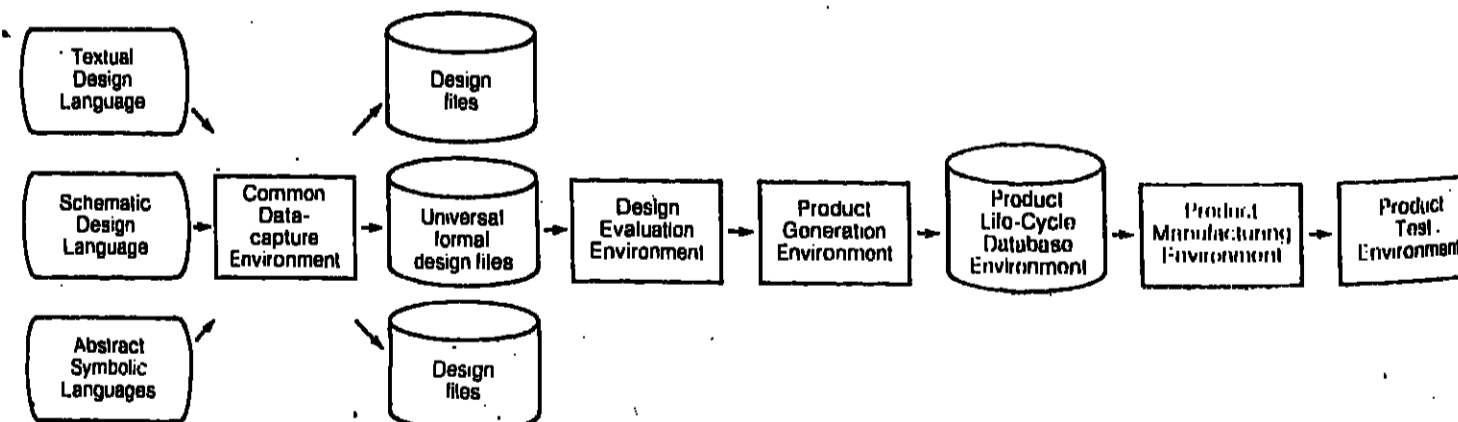
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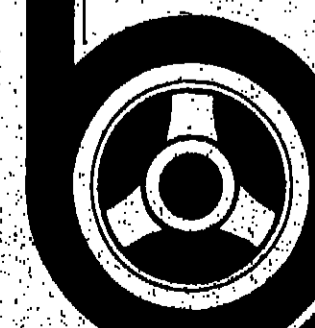
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THE NATIONAL INSTITUTE FOR HIGHER EDUCATION Limerick NEW OPPORTUNITIES IN COMPUTER EDUCATION

The Institute has undertaken a major expansion of its programmes of education in computer systems at undergraduate and postgraduate level as part of the Government's special manpower programme to provide key personnel in areas of economic expansion. Consequently the Institute wishes to recruit a number of staff:

(a) Academic staff to teach courses in Programming Languages (COBOL, FORTRAN, BASIC PLUS, PASCAL), File Processing, Systems Analysis and Design, Computer Organisation and Computer Systems. Appointment may be made at Senior Lecturer, Lecturer or Assistant Lecturer level.

(b) Computer Centre Staff (Operation and Technical Support)

(c) Candidates for operations posts should have experience on either (or preferably both) DEC II and ICL 2903 Series and should be capable of operating a mixed configuration (unsupervised)

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Application forms may be collected at the Personnel Office, N.I.H.E., Limerick, or at any Regional National Manpower Service Office. Completed applications may be returned to either of the above offices on or before Friday, 27 July, 1979.

Due to the current postal difficulties in the Republic of Ireland, application forms for any of the above posts at the National Institute for Higher Education, Limerick, may be obtained from the Personnel Office, Queens University, Belfast. Completed applications may be returned to the same office on or before Friday, 27 July, 1979.

Further information may be obtained from either John Barratt (Director of Computer Services) or Personnel Department, N.I.H.E., Limerick. Telephone: Limerick 43844

Please address all correspondence to:

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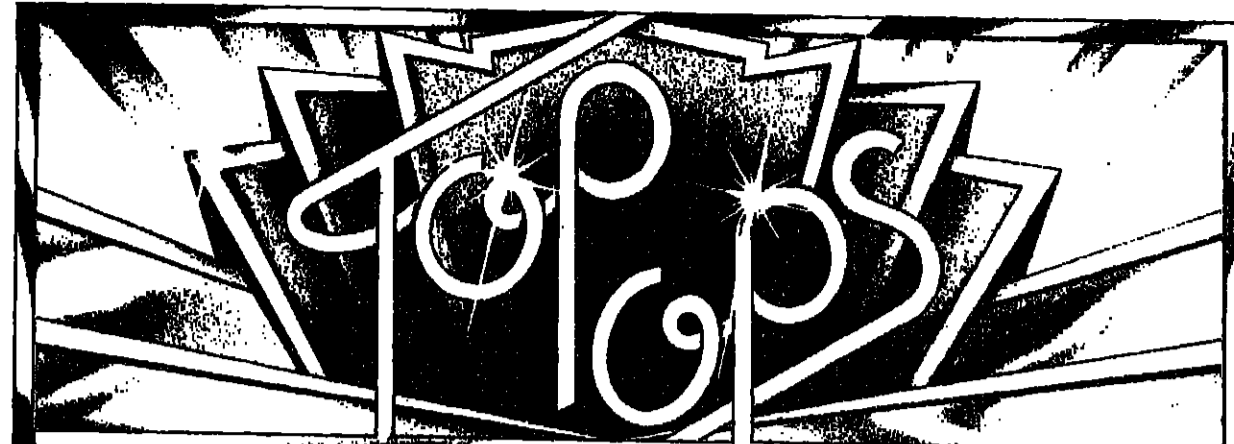
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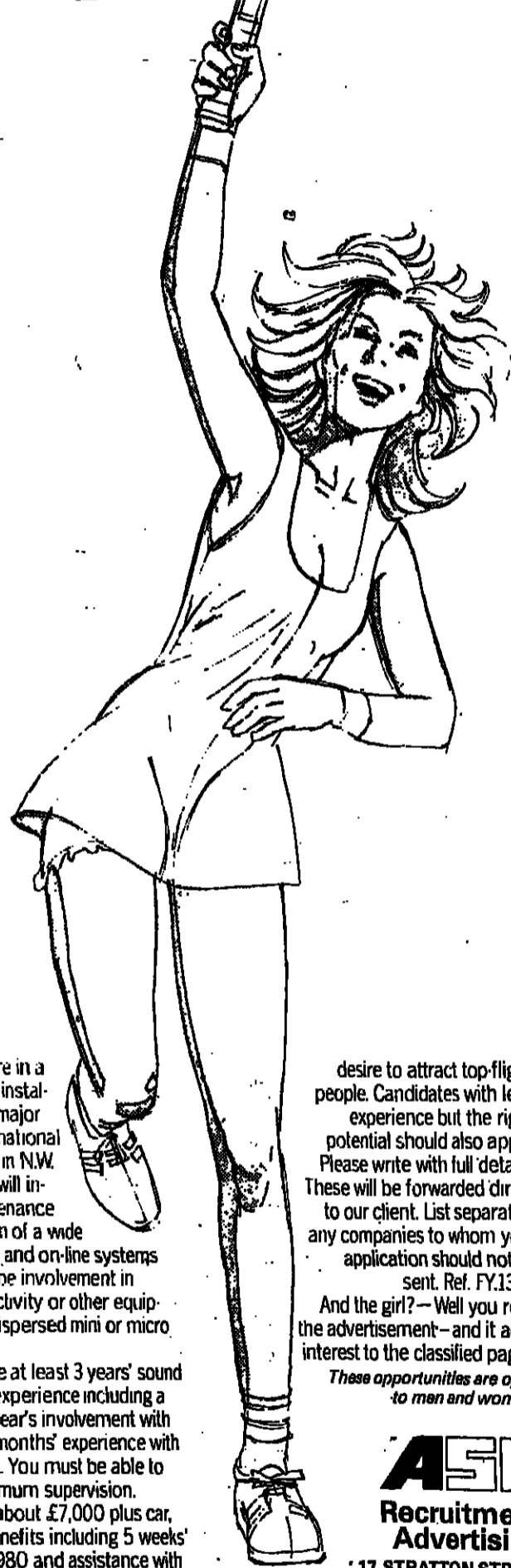
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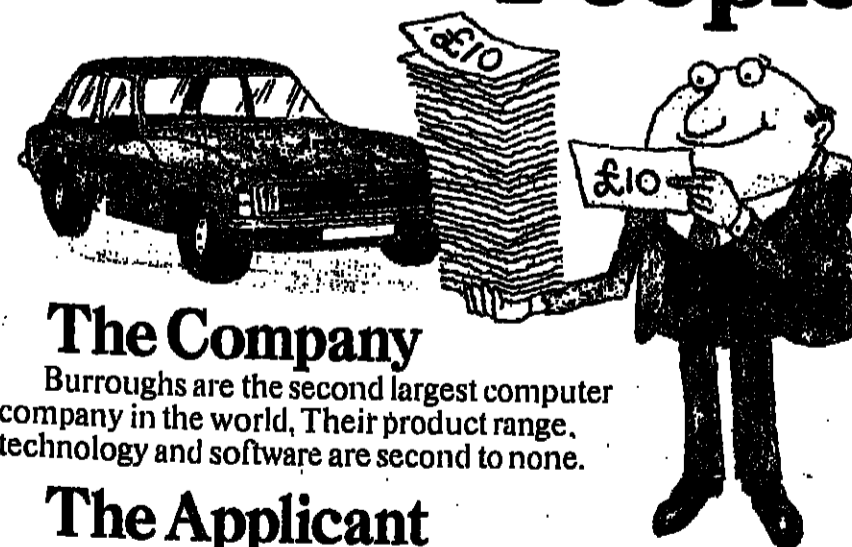
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Twin ICL 2950
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Responsibility is to the Computer Services Manager for controlling all systems software evaluation, development and maintenance, the establishment and development of programming standards, the administration of programming project teams, the development of specialised technical systems, and planning the future move from DME to VME.

Substantial experience in PLAN and COBOL coupled with a demonstrable technical knowledge of ICL on-line/real time communications software are prime requisites. Practical experience in introducing and developing structured programming techniques would be advantageous.

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Further information and form of application from the Assistant Director and Chief Administration Officer, Trent Polytechnic, Burton Street, Nottingham, NG1 4BU.

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Applicants are invited from candidates holding a university honours degree or equivalent for an appointment as Programmer or Analyst on Grade 1A or 11 of the scale for Other Related academic staff, for which the salary scale from 1st October 1979 will range from £4335-£7921 and from £7247-£10962. The post is primarily concerned with the provision of advisory, consultancy and related information services associated with a large ICL 2370 computer which runs with batch processing and interactive (MVS) work under the VME/8 operating system. A knowledge of at least one high level programming language, together with experience of applications programming, is required.

Further particulars may be obtained from the Secretary of the University Court (Room 119, University of Glasgow, Glasgow, G12 8QQ), with whom applications (3 copies), giving the name and address of at least three referees, should be lodged on or before 31st July, 1979.

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The Computer Officer will be required to advise top management upon company matters and to implement and maintain computer applications, including feasibility and cost benefit studies, of both the mainframe machine and Brent's Rediton Speech-Key to-Disc Data Preparation system.

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Application forms and job description from the Administration Manager, Room 708, Brent House, High Road Wembley, Middlesex, Wembley immediately. Telephone 01-903 0311 (24 hour Answering Service). Reference Number FUG 210 must be quoted.

London Borough of **BRENT**

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OPERATOR

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£8080/8702 p.a. inclusive

GMC is installing a computerised Urban Traffic Control System which includes a central computer system and a large data transmission network connected to approximately 630 traffic signal installations covering a major part of the Greater Manchester area. The first signals are due to be connected to the computer at the beginning of 1980.

The person appointed will take full responsibility for the work of the Hardware Team and will be expected to contribute to future development plans for the system. Duties of the team will include first line maintenance on the equipment installed at the UTC Centre and on the street, together with control desk operation and liaison with maintenance Contractors. The control room at the UTC Centre, near County Hall, acts also as a Fault Report Centre and Technicians working on a shift basis. Work also includes commissioning in progress which will continue until 1982. Tenders for a closed circuit television system are scheduled to be invited in 1979.

Applicants should be experienced in the management of technical staff and be suitably qualified with experience in electronics, computer hardware and data transmission; traffic experience and knowledge of traffic control equipment is desirable, but not essential.

Conditions of service include removal, legal etc. expenses up to £760; lodging allowance; 26 days' annual leave + 8 statutory holidays. Applications by letter giving full career and relevant personal details and two references to the County Personnel Officer, County Hall, Piccadilly Gardens, Manchester M60 3HP by 16th July.

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Salary range £5,263-£6,774, plus current self-financing productivity payment and the benefits normally associated with a large progressive organisation.

Please apply, quoting reference OLI/330 to: Margaret Harrison, Personnel Assistant, British Gas Corporation, Research and Development Division, On-Line Inspection Centre, PO Box 3, Cramlington, Northumberland NE23 9EQ. Telephone: Cramlington (0670) 718401.

BRITISH GAS

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Please send career details, listing separately employers to whom we should not forward your reply, to Charles Barker Recruitment Ltd., 19th Floor, Kennedy Tower, Snow Hill Queensway, Birmingham B4 6JB.

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The posts are open to men and women.

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CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring David Abbey for further details on 01-261 8016.

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Interested, then for further information contact REX SCOONES at Croydon office. Ref. CW 158-9S

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Aged 40-45

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Applicants must have a degree or have a graduate equivalent status in mathematics, computer science or other relevant discipline. Have at least two years' post graduate experience (four years for the Team Leader post) of programming in a scientific, technological or commercial field, preferably in a variety of computer languages. Interested applicants may contact Mr. K. Northampton, telephone Coventry (0203) 24 185, Ext. 222, for informal discussions. For application forms and job specifications please apply in writing, enclosing a large stamped and addressed envelope, to the Personnel Officer, Lanchester Polytechnic, Priory Street, Coventry, CV1 5FR, returnable by Monday, July 16, 1979.

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THE SALES AND MARKETING BIT

A CODE OF CONDUCT FOR PROFESSIONAL SALESMEN—PART 1

The way to preserve integrity in selling activities

A COUPLE of years ago I received through the offices of Computer Weekly a copy of a code of conduct issued by the British Computer Society asking for my comments and augmentations.

The fact is I never did receive an acknowledgment of my subsequent remarks. However, on several occasions since, I have thought it might be a good idea to publish my own version of a code of conduct for salesmen and ask readers of the Sales and Marketing Bit for their comments and opinions in order to finally produce a working document which could be passed to sales organisations throughout the industry as a basis for the formal code of professional behaviour for their selling staff.

So, over the next three weeks I would like to state my "30 Commandments for Professional Salesmen" and see how you react to them. There is an assumed code of practice among professional sales people which is based on common sense, integrity and the laws of the land. While the number of occasions on which these unwritten rules are breached are few and far between it is important, particularly to those who are new to selling or involved in some related peripheral activity, that the behaviour expected of those involved in providing products and services for gain is formally declared to all people on either side of the buying and selling process. Here are my thoughts on the basic rules which might be applied:

1. The salesman shall only promise and subsequently take on commitments to supply those products and/or services which his company is able to provide and has authorised him to sell in terms of price, performance and delivery.

2. The salesman will always act in a loyal and honest manner and openly declare his status as a representative of his company.

3. The salesman will never promise or give away any part of his commission earnings in order to solicit business.

4. The salesman will continually endeavour to sustain the immediate and ongoing satisfaction of the client on a basis of trust and good faith and to the best of his ability assist the client in achieving the lasting and profitable benefits of his investment.

5. The salesman will ensure that any contract between his client and his company is explicit, unambiguous and complete in such a way that it can subsequently continue to operate without undue hindrance should the involvement of either his direct contact or himself be terminated. Such an agreement will obey both the

spirit as well as the letter of any contract and of the law.

6. The salesman will use his best endeavours to ensure after-sales service/maintenance is provided, and at a reasonable frequency and price commensurate with the nature of the product provided.

7. The salesman will ensure that the client is aware of any additional work or expense he will incur by using the product or service he is being sold.

8. The salesman will make the client fully aware of any risks implicit in the purchase and use of the product being sold and any ways in which it might adversely affect his plans.

9. The salesman will ensure that the client has a complete understanding of the pricing of the product being sold and inform him of any impending price changes.

10. The salesman will inform the client of any positively known plans to withdraw or supersede the product being sold.

That's all for this week. I hope by the time this is finished in two weeks from now you will have generated some ideas of your own on what a code of conduct for salesmen should look like.

TRADER

Readers are invited to comment on the subjects discussed in Sales Bit, or to write about their own experiences in the market place. Letters should be addressed to Trader, Computer Weekly, Dorset House, Stamford Street, London, SE1 9LU.

ON THE MOVE

Seicon offices

NEW offices have been opened in Weymouth, Dorset, by Seicon Consultancy International. The location was chosen because it is ideally positioned to handle work from the Ministry of Defence which now accounts for a significant proportion of this company's business. The new address is 43/44 St Mary's Street, Weymouth.

Fungus spreads

SPREADING through Europe, Fungus Computer Products now has a distributor in Portugal, Ditrax Componentes-e-Electronica Lda, Avenue Miguel Bamberda, in Lisbon. In another move to improve service to customers, Fungus has reached agreement with Billing Machines Ltd to pool resources instead of competing for the same market.

To Stockport

IN the north-west Gelsco has moved its office to Regent House, Stockport. As well as sales and administration staff, the new premises house a customer education facility.

Puzzle Answer

THE clock face itself had been replaced with a dart-board. So at 12 o'clock the hour hand was pointing to 20.

ball size 1 1/2

SYSTEMS ANALYSTS

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Sperry Gyroscope is a major defence systems contractor based in Bracknell, Berkshire.

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The position will involve some travelling to locations in Wales and the south west of England.

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We offer a competitive salary, Company car, contributory Pension and Life Assurance Scheme, plus other benefits associated with a major company.

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A member of the Bess Group



OPERATIONS STAFF

which combines the commercial and scientific-oriented languages. *pro-* (from *programma*, a letter.) *progress*, *pro'gres*, sometimes (esp. in U.S.) *pro'*, *n.* forward movement: advance: continuation: advance to something better or higher in development: gain in proficiency: course: passage from place to place: a procession: a journey of state: a circuit. *-v.t.* *progress* (formerly, as *Shak.*, *pro'*), to go forward: to make progress: to go on, continue: to go in progress, *in* state. *-v.t. (obs.)* to traverse. *-n.* *pro-* (*pro-*, *pro'-gress*)

Making Any?

It's a fact of life that many people are in jobs that offer them little chance of any real career progression. Progression into positions with more responsibility with the chance to gain valuable experience and, of course, better rewards.

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£5700-£7000 inc. shift allowance

with a wide ranging operations and IBM background and experience of JCL, DP and OS/VS2. You will be involved in both Machine Room operations where you will be responsible for supervising Operators and controlling hardware

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FOR DETAILS OF THESE AND OTHER CONTRACTS PLEASE CONTACT JUDY LEES/LYNN BARTON ON 061-833 9341/5 (24 HRS.)

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OFFICES: LONDON, BIRMINGHAM, MANCHESTER, PARIS, AMSTERDAM, BRUSSELS
INTERNATIONAL DATA PROCESSING CONSULTANTS

Programmer

A firm of consulting engineers requires an applications programmer for the computing department of the head office in Westminster. The department provides technical programming, mathematical consultancy and data processing services to engineering teams and other departments. A Harris 5123 virtual memory system is currently being installed. CDC6600 and Cyber 175 computers are used on a bureau basis.

Work on a wide variety of projects is envisaged, demanding skills in problem definition, numerical analysis, simulation and computer graphics. A good degree in a numerate discipline is required with at least two years experience of programming, engineering or scientific applications in FORTRAN.

Apply in writing or telephone for an application form to:-

W. C. W. Hood,
BINNIE & PARTNERS,
Consulting Engineers,
Artillery Row, London SW1P 1RX.
01-222 7755 Ext. 307

ASSISTANT TO D.P. MANAGER IN SOMERSET

Company: Merritt Holdings. Equipment: ICL 2903-5.

Responsibilities: Day-to-day running of computer operations maintenance of existing system. Active involvement in future application.

Requirements: RPL II experience. Preferred ICL operations experience. Initiative and ability to take responsibility.

Salary: Negotiable by negotiation, including profit sharing.

Merritt is a small and rapidly expanding company who are committed to an ambitious systems development programme, to include the use of communications facilities.

Therefore successful applicant must have management experience and potential.

Applications, stating experience in writing to: C. J. Jackson, D.P. Manager, Merritt Holdings Limited, Mill Norton, Somerset.

Management Information Centre -Waltham Forest Precinct

SENIOR LIAISON OFFICER AP3/4

The Information and Data section of the Management Information Centre require a Senior Liaison Officer. This vacancy has been created by the appointment of a Senior Liaison Officer to Deputy Principal Information Officer in the Section.

The section collects data from a variety of sources throughout the Polytechnic for the maintenance of various computerised record files on staff, students, applications, courses, etc. It also handles enquiries for information from a wide range of users, both internal and external.

The person appointed will be responsible for a computerised file area and its related statistical analyses. He/she will also be expected to assist the other members of the section whenever necessary. A knowledge of data processing and computer file management programs, whilst preferable, is not essential, as any necessary training will be given.

The inclusive annual salary is on a scale ranging from £4053 to £4963 according to age, qualifications and experience.

For further information and application form please contact the Personnel Office, North East London Polytechnic, 109 The Grove, Stratford, E15. Telephone 955 0811, ext. 32, quoting reference number AS1/79. Closing date: July 20, 1979.

NELP North East London Polytechnic

METROPOLITAN Borough of Trafford Borough Treasurer Department

Data Based Administrator P.O.2 (1-5) (£7,044-£7,788 inclusive)

The Council operates an IBM 370-138 under DOS/VS. A variety of financial and other applications are using both On-Line and under batch processing and several applications are under development using RANIS 11.

Due to startling changes it is intended to appoint a data based administrator to transfer the projected move into a full data base environment. A senior position within the computer section is offered together with responsibility for all aspects of data base planning, development and control.

The successful candidate will have the ability to motivate a team with drive and initiative and in addition to high level of expertise in systems analysis and design will be required to submit a report on the success of the development programme. Experience in local government and/or data based systems would be advantageous.

Application forms and further information from Mrs S. Dawson (Tel. 061-960 3101, Ext. 242). Completed forms should be returned to the Borough Treasurer, P.O. Box 10, Warburton House, 35-37 Washway Road, Salford M3 1AL, by 20th July.

OPERATIONS CONTROLLER

No shifts. Salary up to £8513 p.a. subject to review with effect 1st July, 1979 likely to be around £7000 p.a.

The person appointed will be responsible to the Data Processing Manager for the function of Mainframe Operations, the running of the T.P. Network, Data Entry and Data Control and will supervise a staff of 19.

Candidates, preferably aged 27+, must have previous supervisor experience and a good knowledge of ICL hardware and software (including GEORGE II).

The corporation runs a twin 2906 configuration in a multi-programming mode under EXEC5 + on a 2 shift system.

As well as a competitive salary we offer flexible working hours, staff restaurant, social club, generous holidays, removal and other relocation expenses.

Application forms and job description are available from the Personnel Section, Civic Offices, Civic Centre, Reading or telephone Reading (0734) 85911, Ext. 2032. Closing date 23rd July, 1979.



READING
Borough Council

NEWCASTLE-UPON-TYNE POLYTECHNIC

Computer Unit

Requires applications for the following posts. The unit provides a computing service for the teaching, research and administrative work of the Polytechnic. It is linked to an IBM 370/158 RISC and operates its own NOVA minicomputer terminal systems. A new minicomputer system is currently being installed.

MANAGER (PRINCIPAL LECTURER)

To head the Programming and Advisory Services division and supervise on academic matters for the Director of Computing. Several years' computing / teaching experience with degree / equivalent qualification required.

SENIOR SYSTEMS PROGRAMMER

To support a new database design system. Experience of systems programming with degree / equivalent qualification required.

For further details and application form please contact the Personnel Office, Newcastle-upon-Tyne Polytechnic, Eldon Building, Eldon Park, Newcastle-upon-Tyne NE6 1RU.

Contract PL1 PROGRAMMER

Heavyweight PL1 Programmer with structured programming design and D.B. experience long contract starting mid-July.

For further details contact: Bridget Kotchie
RENDECK LTD, 100 New Bond St.
London W1. Tel: 01-629 5438

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